BRITISH COLUMBIA
MINISTRY OF FORESTS

Okanagan Timber Supply Area

Rationale for Allowable Annual Cut (AAC) Determination

Effective August 1, 2001

Larry Pedersen
Chief Forester

LEGISLATIVE LIBRARY OF BRITISH COLUMBIA
3 3298 00246 1987

Table of Contents

Objective of this document 3
Description of the TSA 3
History of the AAC 4
New AAC determination 5
Partition definitions 5
Information sources used in the AAC determination 5
Role and limitations of the technical information used 6
Statutory framework 7
Guiding principles for AAC determinations 7
The role of the base case 9
Base case for the Okanagan TSA 10
Consideration of factors as required by Section 8 of the *Forest Act* 11
Land base contributing to timber harvest 11
- general comments 11
- physical and economic operability 12
- environmentally sensitive areas 12
- low productivity sites 13
- problem forest types 13
- deciduous forest types 14
- roads, trails and landings 15
- timber licence reversions 16
- woodlot licences 16
- protected areas 17
Existing forest inventory 18
- current inventory 18
- volume estimates for existing stands 19
Expected rate of growth 19
- site productivity estimates 19
- volume estimates for regenerating stands 20
- operational adjustment factors (OAF) 21
- minimum harvestable age 23
Forest re-establishment 23
- regeneration delay 23
- impediments to prompt regeneration 24
- not-satisfactorily-restocked (NSR) areas 24

Silvicultural systems 25
Incremental silviculture 25
Commercial thinning 26
Utilization standards 26
Decay, waste and breakage 26
Integrated resource management objectives 27
- cutblock adjacency and green-up 27
- visually sensitive areas 28
- lakeshore management zones 29
- cultural heritage resources 30
- community watersheds 31
- riparian areas 32
- wildlife habitat 33
- stand-level biodiversity 37
- landscape-level biodiversity 38
Okanagan-Shuswap Land and Resource Management Plan 40
- First Nations considerations 41
Harvest sequencing and profile 43
Alternative rates of harvest 44
Community dependence on the forest industry 45
Timber processing facilities 46
- existing mills 46
- proposed facilities 46
Economic and social objectives 46
- Minister's letter and memorandum 46
- local objectives 47
Abnormal infestations and salvage 48
Reasons for decision 51
Determination 53
Partition definitions 54
Implementation 54
Appendix 1: Section 8 of the *Forest Act* 55
Appendix 2: Section 4 of the *Ministry of Forests Act* 57
Documents attached: 57
Appendix 3: Minister of Forests' letter of July 28, 1994 57
Appendix 4: Minister of Forests' memo of February 26, 1996 57
Appendix 5: Summary of Public Input 57

Objective of this document

This document is intended to provide an accounting of the factors I have considered and the rationale I have employed as chief forester of British Columbia in making my determination, under Section 8 of the *Forest Act*, of the allowable annual cut (AAC) for the Okanagan Timber Supply Area (TSA). This document also identifies where new or better information is needed for incorporation in future determinations.

Description of the TSA

The Okanagan TSA, located in the Kamloops Forest Region in south-central British Columbia, encompasses all of the Penticton, Vernon, and Salmon Arm Forest Districts. The TSA is one of the largest in the province, occupying a total area of 2 246 713 hectares. It extends from the border between Canada and the United States of America north to the Seymour River watershed and east from the Okanagan Range to the Monashee Mountains.

Between 1991 and 1996, the population of the Okanagan TSA increased by 19 percent to 313 000. Over one-half of the population of the Okanagan TSA lives in the communities of Kelowna, Vernon, Penticton, and Salmon Arm.

The Okanagan TSA is economically well diversified, relying on agriculture, tourism, and construction in varying degrees. In 1996, the forestry sector accounted for 11 percent of the TSA's total employment. The major forest licensees in the TSA are Weyerhaeuser Canada Limited, Riverside Forest Products Limited, Tolko Industries Limited, Gorman Brothers Lumber Limited, Louisiana-Pacific Canada Engineered Wood Products Limited, Federated Co-operatives Limited, and Bell Pole Limited.

Members of eleven First Nations reside in or have asserted traditional territories within the Okanagan TSA. Seven Okanagan bands (Lower Similkameen, Upper Similkameen, Osoyoos, Penticton, Westbank, Okanagan, and Upper Nicola) are associated with the Okanagan Nation Alliance and two Shuswap bands (Adams Lake and Neskonlith) belong to the Shuswap Nation Tribal Council. The Little Shuswap and Spallumacheen bands are independent, but are considered part of the Shuswap Nation Community. The Upper Nicola Band is considered part of the Okanagan Nation Alliance as well as the Nicola Tribal Association.

The TSA is one of the most ecologically complex in the province. Terrain varies from hot, dry sagebrush grasslands in the south to wet cedar-hemlock forests in the north to the treeless slopes of the Monashee Mountains in the east. The diversity of topography, climate, and soils is reflected in the forest vegetation found within the TSA and is described by seven biogeoclimatic zones: Bunchgrass, Ponderosa Pine, Interior Douglas-fir, Montane Spruce, Engelmann Spruce-Subalpine Fir, Interior Cedar Hemlock, and Alpine Tundra. The broad variety of habitat types supports many species, including approximately 30 red- and blue-listed vertebrates that are associated with forested ecosystems. The main commercial tree species are lodgepole pine, Douglas-fir, spruce, subalpine fir (balsam), western redcedar, and western hemlock.

Water is a primary and fundamental resource of the Okanagan TSA. Whether occurring as surface or groundwater, it is a crucial component of the ecosystems found in the TSA. As well, the rivers and lakes of the TSA are home to numerous fish species including kokanee, rainbow trout, lake char, largemouth bass, and whitefish. The Shuswap Lake system supports sockeye lake spawners and provides vital rearing areas for hundreds of millions of coho, chinook, and sockeye salmon fry, making it one of the most important salmon-producing areas in British Columbia. The Adams River sockeye run is the second largest in the province.

About 64 percent of the TSA (1 441 931 hectares) is considered productive Crown forest, of which 1 031 101 hectares (46 percent) constitutes the land base on which timber harvesting is expected to occur into the future. The difference between the timber harvesting land base and the productive forest is largely attributable to unmerchantable forest types and inoperable areas.

History of the AAC

The allowable annual cut (AAC) for the Okanagan TSA from 1980 to 1986 was 2 700 000 cubic metres. Between 1987 and 1991, temporary increases of between 120 000 cubic metres and 500 000 cubic metres were authorized to harvest timber affected by mountain pine beetle infestations, for total annual harvests of between 2 820 000 cubic metres and 3 200 000 cubic metres. In 1992, the AAC was decreased to 2 615 000 cubic metres; annual uplifts in harvesting for mountain pine beetle continued in 1992 (200 000 cubic metres) and in 1993 (189 000 cubic metres), for total annual harvests of 2 815 000 cubic metres and 2 804 000 cubic metres respectively. The AAC was maintained in the previous determination, effective January 1, 1996 and was apportioned by the Minister of Forests as follows:

Apportionment	AAC (m^3/yr)	% of total AAC
Forest licences (replaceable)	2 138 867	81.8
Forest licences (non-replaceable)	15 000	0.6
Timber sale licences (< 10 000 m^3/yr)	35 936	1.4
Small Business Forest Enterprise Program - all categories	361 974	13.8
Forest Service Reserve	26 150	1.0
Woodlot licences	37 073	1.4
Total	**2 615 000**	**100.0**

New AAC determination

Effective August 1, 2001, the new AAC for the Okanagan TSA will be 2 655 000 cubic metres. Of this total AAC, 2 575 000 cubic metres is to be harvested from the timber harvesting land base as described and included in the current analysis, and the remaining AAC to be administered as a partition of the AAC as follows:

- 80 000 cubic metres per year for the small-scale salvage program (see "Partition definitions").

This determination excludes all woodlot licences issued at this time. This AAC will remain in effect until a new AAC is determined, which must take place within five years of this determination.

Partition definitions

Small-scale salvage program:

The partition is with respect to dead trees or trees that will not survive as a result of windthrow and/or insect attack,with recognition of the need for access to necessary amounts of live and merchantable trees required for safety, to a maximum volume of 500 cubic metres if salvage is concentrated; or 50 cubic metres per hectare if salvage is scattered. It is reasonable to expect that some level of flexibility will be required in implementing this partition and I leave its further administration to the discretion of the district managers and/or the regional manager.

Information sources used in the AAC determination

Information considered in determining the AAC for the Okanagan TSA includes the following:

- *Okanagan Timber Supply Area (TSA) Data Package and Information Report*, British Columbia Forest Service (BCFS), June 1999;
- *Okanagan TSA Analysis Report and Public Discussion Paper*, BCFS, July 2000;
- *Okanagan TSA Summary of Public Input on Data Package and TSA Analysis Report*, BCFS, December 2000 (draft);
- *Okanagan TSA Inventory Audit*, BCFS Resources Inventory Branch, 1997;
- *Inventory Adjustment of Pine and Hemlock Problem Forest Type Stands in the Okanagan TSA using the Fraser TSA method*, J. S. Thrower and Associates, October 20, 1998;
- *Okanagan Timber Supply Area – Integrated Resource Management Timber Harvesting Guidelines*, BCFS, February 1992;
- *Okanagan TSA Rationale for AAC determination*, BCFS, January 1996;
- *Forest Practices Code of British Columbia Act*, consolidated to March 2001;

- *Forest Practices Code of British Columbia Act Regulations and Amendments*, current as of March 2001;
- *Forest Practices Code of British Columbia Guidebooks*, BCFS and Ministry of Environment, Lands, and Parks (MELP);
- *Forest Practices Code Timber Supply Analysis*, BCFS and MELP, February 1996;
- *Okanagan-Shuswap Land and Resource Management Plan*, January 18, 2001;
- *Working Paper 36/1998, Site Index Adjustments for Old-Growth Stands Based on Veteran Trees*, Nigh, G.D., BCFS Research Branch, 1998;
- *Working Paper 37/1998, Site Index Adjustments for Old-Growth Stands Based on Paired Plots*, Nussbaum, A.F., BCFS Research Branch, 1998;
- Letter from the Minister of Forests to the chief forester, dated July 28, 1994, stating the Crown's economic and social objectives for the province;
- Memorandum from the Minister of Forests to the chief forester, dated February 26, 1996, stating the Crown's economic and social objectives for the province regarding visual resources;
- Letter from the deputy ministers of Forests and Environment, Lands and Parks, dated August 25, 1997, conveying government's objectives for achieving acceptable impacts on timber supply from biodiversity management; and
- Technical review and evaluation of current operating conditions through comprehensive discussions with staff of the BCFS and MELP, including the AAC determination meeting held in Kelowna, January 16 and 17, 2001.

Role and limitations of the technical information used

Section 8 of the *Forest Act* requires the chief forester to consider biophysical as well as social and economic information in AAC determinations. A timber supply analysis, and the inventory and growth and yield data used as inputs to the analysis, typically form the major body of technical information used in AAC determinations. Timber supply analyses and associated inventory information are concerned primarily with biophysical factors—such as existing timber volumes, the rate of timber growth, and definition of the land base considered available for timber harvesting—and with management practices.

However, the analytical techniques used to assess timber supply are necessarily simplifications of the real world. Many of the factors used as inputs to timber supply analysis are uncertain due in part to variations in physical, biological and social conditions. Ongoing science-based improvements in the understanding of ecological dynamics will help reduce some of this uncertainty.

Furthermore, technical analytical methods such as computer models cannot incorporate all of the relevant social, cultural and economic factors when making forest management decisions. Therefore, technical information and analysis do not necessarily provide complete answers or solutions to forest management problems such as AAC

determinations. The information does; however, provide valuable insight into potential impacts of different resource-use assumptions and actions, and thus forms an important component of the information required to be considered in AAC determinations.

In determining the AAC for the Okanagan TSA, I have considered the known limitations of the technical information provided, and am satisfied that the information provides a suitable basis for my determination.

Statutory framework

Section 8 of the *Forest Act* requires the chief forester to consider particular factors in determining AACs for timber supply areas and tree farm licences. Section 8 is reproduced in full as Appendix 1.

Guiding principles for AAC determinations

Rapid changes in social values and in our understanding and management of complex forest ecosystems mean that there is always some uncertainty in the information used in AAC determinations. In making a large number of determinations for many forest management units over extended periods of time, administrative fairness requires a reasonable degree of consistency of approach in incorporating these changes and uncertainty. To make my approach in these matters explicit, I have set out the following body of guiding principles. If in some specific circumstance it may be necessary to deviate from these principles, I will provide a detailed reasoning in the considerations that follow.

Two important ways of dealing with uncertainty are:

(i) minimizing risk, in respect of which in making AAC determinations, I consider the uncertainty associated with the information before me, and attempt to assess the various potential current and future social, economic and environmental risks associated with a range of possible AACs; and

(ii) redetermining AACs frequently, to ensure they incorporate current information and knowledge—a principle that has been recognized in the legislated requirement to redetermine AACs every five years. The adoption of this principle is central to many of the guiding principles that follow.

In considering the various factors that Section 8 of the *Forest Act* requires me to take into account in determining AACs, I attempt to reflect as closely as possible operability and forest management factors that are a reasonable extrapolation from current practices. It is not appropriate to base my decision on unsupported speculation with respect either to factors that could work to *increase* the timber supply—such as optimistic assumptions about harvesting in unconventional areas, or using unconventional technology, that are not substantiated by demonstrated performance—or factors that could work to *reduce* the timber supply, such as integrated resource management objectives beyond those articulated in current planning guidelines or the *Forest Practices Code of British Columbia Act*.

The *Forest Practices Code of British Columbia Regulations* were approved by the Lieutenant Governor in Council on April 12, 1995, and released to the public at that time.

The *Forest Practices Code of British Columbia Act* (Forest Practices Code) was brought into force on June 15, 1995.

Although implementation of the Forest Practices Code has been underway since the end of the transition period on June 15, 1997, the timber supply implications of some of its provisions, such as those for landscape-level biodiversity, still remain uncertain, particularly when considered in combination with other factors. In each AAC determination I take this uncertainty into account to the extent possible in context of the best available information.

As British Columbia progresses toward the completion of strategic land use plans, the eventual timber supply impacts associated with land-use decisions resulting from the various planning processes—including the Commission on Resources and Environment (CORE) process for regional plans, the Protected Areas Strategy, and Land and Resource Management Planning (LRMP) process—are often discussed in relation to current AAC determinations. Since the outcomes of these planning processes are subject to significant uncertainty before formal approval by government, it has been and continues to be my position that in determining AACs it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions not yet taken by government. Thus I do not account for possible impacts of existing or anticipated recommendations made by such planning processes, nor do I attempt to anticipate any action the government could take in response to such recommendations.

Moreover, even where government has made a formal land-use decision, it may not always be possible to fully analyze and account for the consequent timber supply impacts in a current AAC determination. In many cases, government's land-use decision must be followed by a number of detailed implementation decisions. For example, a land-use decision may require the establishment of resource management zones and resource management objectives and strategies for these zones. Until such implementation decisions are made it would be impossible to fully assess the overall impacts of the land-use decision. Nevertheless, the legislated requirement for five-year AAC reviews will ensure that future determinations address ongoing plan implementation decisions.

However, where specific protected areas have been designated by legislation or by order in council, these areas are deducted from the timber harvesting land base and are no longer considered to contribute to the timber supply in AAC determinations.

In the Okanagan TSA, government's approval of the Okanagan-Shuswap Land and Resource Management Plan (OSLRMP) on January 17, 2001, has clarified many aspects of land and resource use and management (see "Okanagan-Shuswap Land and Resource Management Plan").

Forest Renewal British Columbia funds a number of intensive silviculture activities that could have the potential to affect timber supply, particularly in the long term. As with all components of my determinations, I require sound evidence before accounting for the effects of intensive silviculture on possible harvest levels. Nonetheless, I will consider information on the types and extent of planned and implemented practices as well as relevant scientific, empirical and analytical evidence on the likely magnitude and timing of any timber supply effects of intensive silviculture.

Some have suggested that, given the large uncertainties present with respect to much of the data in AAC determinations, any adjustments in AAC should wait until better data are available. I agree that some data are not complete, but this will always be true where information is constantly evolving and management issues are changing. Moreover, in the past, waiting for improved data created the extensive delays that resulted in the urgency to redetermine many outdated AACs between 1992 and 1996. In any case, the data and models available today are superior to those available in the past, and will undoubtedly provide for more reliable determinations.

Others have suggested that, in view of data uncertainties, I should immediately reduce some AACs in the interest of caution. However, any AAC determination I make must be the result of applying my judgement to the available information, taking any uncertainties into account. Given the large impacts that AAC determinations can have on communities, no responsible AAC determination can be made solely on the basis of a response to uncertainty. Nevertheless, in making my determination, I may need to make allowances for risks that arise because of uncertainty.

With respect to First Nations' issues, I am aware of the Crown's legal obligations resulting from recent decisions in the Supreme Court of Canada. The AAC that I determine should not in any way be construed as limiting the Crown's obligations under these decisions, and in this respect it should be noted that my determination does not prescribe a particular plan of harvesting activity within the Okanagan TSA. It is also independent of any decision by the Minister of Forests with respect to subsequent allocation of the wood supply.

Overall, in making AAC determinations, I am mindful of my obligation as steward of the forest land of British Columbia, of the mandate of the Ministry of Forests as set out in Section 4 of the *Ministry of Forests Act*, and of my responsibilities under the *Forest Practices Code of British Columbia Act*.

The role of the base case

In considering the factors required under Section 8 of the *Forest Act* to be addressed in AAC determinations, I am assisted by timber supply forecasts provided to me through the work of the Timber Supply Review program for TSAs and TFLs.

For each AAC determination for a TSA, BCFS staff carry out a timber supply analysis using an information package including data and information from three categories: land base inventory, timber growth and yield, and management practices. Using this set of data and a computer model (FSSIM—"Forest Service Simulator") a series of timber supply forecasts are produced reflecting different decline rates, starting harvest levels, and potential trade-offs between short- and long-term harvest levels.

From this range of forecasts, one forecast is chosen which attempts to avoid excessive changes from decade to decade and significant timber shortages in the future, while ensuring the long-term productivity of forest lands. Often termed the "base case," it serves as a reference forecast and forms the basis for comparison when assessing the implications of uncertainty for timber supply.

Because it represents only one of many theoretical forecasts and incorporates information that has some uncertainty, the reference forecast for a TSA is not an AAC recommendation. Rather, it is one possible forecast of timber supply, whose validity—as with all the other forecasts provided—depends on the validity of the data and assumptions incorporated into the computer simulation used to generate it.

Therefore, many of the following considerations examine the degree to which all the assumptions made in generating the reference forecast are realistic and current, and the degree to which the resulting predictions of timber supply must be adjusted, if necessary, to more properly reflect the current situation.

These adjustments are based on informed judgement, using current, available information about forest management. Such information may have changed since the original information package was assembled. Forest management data are particularly subject to change during periods of legislative or regulatory change, such as the enactment of the Forest Practices Code, or during the implementation of new policies, procedures, guidelines or plans.

The timber supply analysis is integral to the considerations that lead to the AAC determination. However, the AAC determination itself is not a calculation. Rather it is a synthesis of judgement and analysis in which numerous risks and uncertainties are weighed.

Depending upon the outcome of these considerations, the AAC determined may or may not coincide with the reference forecast. Judgements that may be based in part on uncertain information are essentially qualitative in nature and, as such, are subject to an element of risk. Consequently, once an AAC has been determined, no additional precision or validation may be gained by a computer analysis of the combined considerations to confirm the exact AAC determined.

Base case for the Okanagan TSA

The base case for the 2000 timber supply analysis incorporates several different assumptions from the base case that was generated in the analysis for the 1996 AAC determination. In overview, it includes the following:

- more complete and accurate accounting for the implementation of the Forest Practices Code;
- updated ownership information;
- recognition of the contribution of parks in achieving non-timber resource objectives;
- re-evaluation of excluded forest types based on an expert inventory;
- inclusion of additional areas of older, predominantly hemlock stands in the timber harvesting land base;
- redefined minimum harvestable ages;
- redefined criteria for sites with low productivity;
- revised approach used in accounting for existing roads, trails and landings;
- improved accuracy in assigning forest cover requirements to visually sensitive areas; and

- lower estimates of unsalvaged losses.

With these and other factors incorporated, a base case forecast was generated and submitted for public review. The base case forecast showed that the current harvest level of 2 615 000 cubic metres per year could be maintained for 14 decades. This was followed by a 10-percent decline to 2 354 000 cubic metres per year for 2 decades, before reaching the steady long-term harvest level of 2 260 000 cubic metres per year.

The Okanagan TSA timber supply review was initiated after the Okanagan-Shuswap Land and Resource Management Plan (OSLRMP) process had been underway for two years. At the time that the base case was completed the OSLRMP had not received government approval, hence the base case assumptions did not reflect the OSLRMP. However, when it became apparent that the OSLRMP would be completed prior to the finalization of this determination, I requested that BCFS staff prepare a revised base case analysis that incorporated the direction of the OSLRMP.

In the OSLRMP-revised base case, the current harvest level of 2 615 000 cubic metres per year could be maintained for 8 decades. The harvest level declined in the next decade by 10 percent to 2 354 000 cubic metres per year for 1 decade, and then to the steady long-term harvest level of 2 076 000 cubic metres per year.

On January 17, 2001, the OSLRMP received Cabinet approval. As a result, I am satisfied the OSLRMP-revised base case provides the best point of reference for my assessment of timber supply for this AAC determination, as discussed in the following considerations and with the qualifications there expressed.

I am satisfied that the OSLRMP-revised base case harvest forecast provides a suitable reference point from which to assess available timber supply in the TSA. However, I have also considered all public input received on the data package and analysis report, and where appropriate I have discussed my considerations under the various factors presented in this rationale.

Consideration of factors as required by Section 8 of the *Forest Act*

Section 8 (8)

In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account
(i) the composition of the forest and its expected rate of growth on the area

Land base contributing to timber harvest

- general comments

The total area of the Okanagan TSA, as reported in the July 2000 timber supply analysis, is 2 246 713 hectares. Of the total TSA area, 1 441 931 hectares (64.2 percent) are classified as productive Crown forest land.

In defining the timber harvesting land base for the Okanagan TSA (i.e., the area estimated to be economically and biologically available for harvesting), a series of deductions were

made from the total productive forest area. These deductions account for factors that effectively reduce the suitability or availability of the productive forest for timber harvesting for economic, ecological or social (e.g., parks) reasons. In timber supply analysis, assumptions, and if necessary, projections, must be made about these factors before quantifying the appropriate amount of area to be deducted from the productive forest, in order to derive the timber harvesting land base. The current timber harvesting land base, as derived in the BCFS timber supply analysis, was 1 057 755 hectares.

In the Okanagan TSA, areas were deducted from the productive forest to account for many factors including roads, trails and landings; riparian reserves; sensitive soils; areas of low productivity; excluded forest types; and inoperable areas.

- physical and economic operability

Those portions of the TSA that are not physically accessible for harvesting, or that are not feasible to harvest economically, were excluded from contributing to the timber harvesting land base.

Operability lines for the Okanagan TSA were developed in 1993 on the basis of slope contour and forest cover information. Areas with soil instability (Es), avalanche concerns (Ea), and swamps were also identified (see *environmentally sensitive areas*). Based on this information, preliminary operability lines were mapped prior to review and finalization by BCFS and forest industry staff. In 1997, maps identifying inoperable areas in the Salmon Arm district were digitally updated for use in this analysis. Based on this approach a total of 115 340 hectares (8 percent) of productive forest area was excluded from the timber harvesting land base. Of this inoperable area, approximately 51 percent, 19 percent, and 31 percent is within the Salmon Arm, Vernon, and Penticton Forest districts, respectively.

The area of the timber harvesting land base in the OSLRMP-revised base case was reduced by an additional area of 720 hectares due to the revision of operability lines in the Penticton Forest district to account for the Derenzy Sheep resource management zone (RMZ).

I have reviewed the information regarding operability with BCFS district staff, and note that operability lines are intended to be a reasonable approximation of the landbase available for timber harvesting and are always subject to some uncertainty. For this determination, I am satisfied that the assumptions regarding operability on which the timber supply analysis was based represent the best available information.

- environmentally sensitive areas

An environmentally sensitive area (ESA) is identified during a forest inventory as an area that is sensitive to disturbance and/or is significantly valuable for fisheries, wildlife, water and, recreation resources. ESA information is used to identify land to exclude from the timber harvesting land base where more specific or detailed information is not available about a particular forest resource.

Areas in the productive forest land base that were classified as ESAs for sensitive soils, unstable terrain, and avalanche areas were considered during the process used to define operability (*see physical and economic operability*). Therefore, no further deductions were made for the analysis to account for these factors.

For this analysis, 47 403 hectares identified as Ep—areas in which the establishment of new stands is expected to be hindered by unpredictable and severe climate (e.g., high elevation sites)— were completely excluded from the timber harvesting land base. Ministry of Environment, Lands, and Parks (MELP) staff noted that the reduction for Ep listed in the analysis report for this timber supply analysis was 90 percent; however, BCFS district staff have confirmed that the Ep areas were in fact completely excluded (100 percent) and that this is reflective of current practice.

Other resource values such as wildlife habitat and recreation were addressed through the forest cover constraints or other reductions applied in the analysis, and are discussed under the appropriate sections of this rationale.

A number of public submissions raised concerns about environmentally sensitive areas. Riverside Forest Products Ltd. (Riverside) expressed interest in monitoring to determine to what extent harvesting is occurring in areas with sensitive soils. BCFS district staff note that a review of operational plans was undertaken that confirmed that the exclusions for ESAs were reflective of current practice. Nonetheless, if the company conducts an analysis and is able to produce information that challenges the current assumptions, I would welcome that and would review it at the time of the next analysis.

For this determination, I am satisfied that the information used in the analysis regarding ESAs was the best available information and that no additional accounting is required.

- low productivity sites

In the timber supply analysis, after accounting for other land base deductions, 17 432 hectares were defined as having characteristics indicative of low site productivity and were therefore excluded from the timber harvesting land base. The criteria used to exclude these areas was based on a range of minimum site indices (estimated tree height at 50 years). The criteria ranged from a minimum site index of 7.5 metres for species such as spruce and lodgepole pine up to a minimum site index of 9 metres for western redcedar. BCFS district staff reviewed the information from the forest inventory indicating that only very small areas of low site have been harvested. On this basis, staff concluded that the definitions of minimum site index used in the analysis are representative of current practice.

Based on the review by district staff as well as consideration of other areas in the province, I find the criteria for minimum site indices to be reasonable. For this determination, I accept the assumptions used to exclude low productivity sites as reflected in the analysis.

- problem forest types

Stands that are physically operable and exceed low site criteria yet are not currently utilized because of low timber quality or volume are referred to as problem forest types. Obviously, this definition is based on economic criteria, for the purpose of defining the net operable land base. It does not imply that these types of forests are not important in terms of their role and function in the ecosystem. In total, 63 434 hectares of coniferous-leading problem forest types were excluded from the timber harvesting land base assumed in the OSLRMP-revised base case.

In the rationale for the previous AAC determination, I noted that "A review of inventory information is necessary in order to clarify stand merchantability and consider potential opportunities for harvest or rehabilitation". In response to this request, an inventory audit, including ground-based surveys, of lodgepole pine and hemlock problem forest types was conducted.

The results of this audit, as reported in *Inventory Adjustment of Pine and Hemlock Problem Forest Type Stands in the Okanagan TSA Using the Fraser TSA Method* (J.S. Thrower and Associates 1998), were used to determine appropriate area exclusions for problem lodgepole pine and hemlock stands. The results of this study led to the re-inclusion of 37 percent (17 680 hectares) of stands, which had previously been identified as problem pine forest types, in the timber harvesting land base. The definition of problem hemlock stands was revised from "stands in which the hemlock volume is greater than or equal to 60 percent of the total stand volume" to "stands in which the hemlock volume is greater than or equal to 70 percent of the total stand volume". Use of the revised definition for hemlock problem forest types led to the re-inclusion of 17 900 hectares in the timber harvesting land base. The audit also indicated that many stands identified in the inventory as pine and hemlock had been mislabelled.

Public input received from the forest industry questioned whether the BCFS was monitoring harvesting performance in problem forest types. BCFS staff confirm that monitoring has occurred and to date there has been very little performance in these forest types. The Shuswap Environment Action Society (SEAS) and the Canadian Earth-Care Society (CES) made several comments, which included a concern that "remaining stands are located on steeper slopes, in higher elevations or on poor growing sites, which means they are more likely to contain lower value stands". However, the change in criteria for problem forest types between the 1996 and 2000 timber supply analyses was made on the bases of new empirical information regarding the forest inventory, rather than on inclusion of marginal sub-alpine stands in the timber harvesting land base or on speculation regarding the merchantability of hemlock.

In summary, I have reviewed and discussed the information regarding problem forest types with BCFS staff. I am satisfied that assumptions regarding problem forest types in the timber supply analysis represent the best available information and are appropriate for use in this determination.

- deciduous forest types

In the OSLRMP-revised base case, a total of 36 064 hectares of deciduous-leading stands were excluded from the timber harvesting land base, and all deciduous volume in coniferous-leading stands was excluded through reductions applied to the yield tables. District staff confirm that volume from deciduous species is not currently utilized in the Okanagan TSA.

From review of the information, I am satisfied that the assumptions regarding deciduous species are appropriate and reflective of current conditions on the TSA.

- roads, trails and landings

In the analysis, a percentage of the productive forested area was excluded to account for the permanent loss of productive land to roads, trails, and landings. Separate estimates are made for existing and future structures, to reflect both potential changes in road building practices and road network requirements over time. Estimates account for the area that is permanently removed from the timber harvesting land base.

Changes in current practices due to implementation of the Forest Practices Code and an improved methodology for estimating productivity losses have resulted in significant changes in the assumptions regarding roads, trails, and landings used in the 1996 and 2000 timber supply analyses. These revised assumptions have resulted in the addition of 42 985 hectares to the timber harvesting land base.

In the rationale for the previous AAC determination I requested BCFS staff improve the methodology used for estimating losses due to existing roads, trails, and landings. As a result of this request, a BCFS pedologist completed an inventory of 89 623 hectares of the timber harvesting land base in the Okanagan TSA that has been subject to past development. Based upon the recommendations from this study an area reduction of 5.4 percent for all forest stands less than 40 years of age and an area reduction of 0.6 percent for all other stands was assumed in the timber supply analysis to account for existing roads, trails, and landings. To account for future roads, trails and landings the study recommended an area reduction of 4.9 percent for all stands currently greater than 40 years of age after their first projected harvest.

Riverside Forest Products Ltd. (Riverside) agreed with the estimates used for roads and landings; however, this licensee expressed the opinion that there should be a lower netdown for existing trails given the increasing requirements to rehabilitate them. BCFS staff noted that there was very little evidence of rehabilitation of trails constructed in the past (i.e., existing trails) observed during the site disturbance inventory. However, staff confirmed that the estimates for future trails used in the analysis were based upon the assumption that there would be 100 percent rehabilitation and full recovery of soil productivity for future bladed trails.

Riverside also expressed concern regarding the 1.7-percent reduction applied for future trails. BCFS staff confirmed that the trails category included all non-bladed trails (i.e., all disturbance other than roads, landings, and excavated trails—excavated trails were assumed to be fully rehabilitated). There was no data from the soil disturbance inventory to support the assertion that operators are implementing less than the maximum guideline disturbance levels of 5 percent and 10 percent; therefore staff consider a 1.7-percent reduction appropriate.

In summary, I note that the assumptions used in the analysis are based upon a recent expert review of about 9 percent of the area of the Okanagan TSA. Therefore, I am satisfied that the assumptions regarding roads, trails, and landings used for this analysis represent the best available information and are suitable for use in this determination.

- timber licence reversions

Timber licences (TLs) are old tenure arrangements that give a licensee exclusive rights to harvest merchantable timber within the licence area. Once these areas have been harvested and have been regenerated to a free growing condition, all future harvesting rights revert to the Crown and future harvests from the area contribute to the harvest for that TSA which contains the TL area.

The total area administered under TLs in the Okanagan TSA is 18 780 hectares. Of this area, 17 315 hectares are forested and after land base exclusions to account for other factors, 14 602 hectares were included in the timber harvesting land base. All stands currently available for harvesting within the TLs are scheduled to be harvested prior to the expiration of the TLs in 2030.

The OSLRMP has recommended a number of protected areas within the Okanagan TSA (see *protected areas*). The Goal 1 protected areas, which were recently approved by an order-in-council, included 350 hectares of timber harvesting land base previously administered under TLs. The OSLRMP-revised base case completely excluded all Goal 1 and Goal 2 protected areas as well as the area within a proposed protected areas strategy corridor.

Having reviewed the information regarding TLs, I am confident that the OSLRMP-revised base case adequately modelled the reversion schedule given the information available. Therefore, I accept the assumptions applied in the analysis to be reasonable for use in this determination. I will discuss my conclusions regarding the exclusion of protected areas under *protected areas*.

- woodlot licences

The *Forest Act* requires AACs determined for TSAs to exclude the areas and timber volumes allocated to woodlot licences.

For this analysis, a total of 28 597 hectares issued to woodlot licences since 1995 were excluded from contributing to the timber harvesting land base. Since the timber supply analysis, review of BCFS records indicates that the area occupied by woodlots is 27 340 hectares. As a result, land base reductions for woodlots in the OSLRMP-revised base case may be over-estimated by about 1257 hectares.

Although the area and volume associated with woodlots were excluded from contributing to the OSLRMP-revised base case, the initial harvest level was not reduced to reflect the 40 000 cubic metres per year that is no longer required to be apportioned from the AAC. However, the fact that the harvest level could be maintained, without contribution from the woodlot areas (or the volume associated with them), is an indication of the stability of timber supply. Furthermore, the unapportioned 40 000 cubic metres reflected in this forecast represents an opportunity to support the goals and objectives of the small-scale salvage program (see Abnormal infestations and salvage). I will discuss this and the 1257 hectare over-estimation in the timber harvesting land base further, under "Reasons for Decisions"

- protected areas

The Okanagan TSA includes 42 515 hectares of existing parks that were excluded from the timber harvesting land base used in the analysis; however, these areas still affect timber supply by helping to meet forest cover objectives.

Government released *A Protected Areas Strategy for British Columbia* in 1993, which describes the policies and process to protect 12 percent of the province. The strategy has two goals: representativeness (Goal 1) which protects viable examples of the natural diversity of the province, and special features (Goal 2) which protect the special natural, cultural heritage, and recreational features of the province.

The OSLRMP proposed 22 Goal 1 and 27 Goal 2 protected areas and a Protected Areas Strategy (PAS) corridor for the Okanagan TSA. The Goal 1 areas include approximately 66 700 hectares of Crown forest within the TSA of which approximately 39 000 hectares are within the timber harvesting land base. The Goal 1 protected areas were established by an order-in-council on April 18, 2001.

The Goal 2 protected areas include approximately 1950 hectares of Crown forest within the TSA of which approximately 990 hectares are within the timber harvesting land base. BCFS district staff indicate that there is still some uncertainty regarding the final boundaries of the Goal 2 protected areas. In any event, the recommended Goal 2 protected areas are still awaiting government approval.

The PAS corridor includes approximately 750 hectares of Crown forest within the TSA of which approximately 690 hectares are within the timber harvesting land base. In the OSLRMP-revised base case areas within the PAS corridor were fully excluded from the timber harvesting land base. However, BCFS district staff indicate that there is still uncertainty regarding the management of these areas. Staff believe that these areas may be available for some level of harvesting and therefore should have been incorporated in the OSLRMP-revised base case with forest cover objectives.

Operationally, the Goal 1 and Goal 2 protected areas and PAS corridor are deferred from harvest, and no harvesting activity within these areas is anticipated to take place in the near future. The original base case did not specifically examine the effect of excluding the Goal 1 and Goal 2 protected areas and PAS corridor, which represent approximately 4 percent of the timber harvesting land base, from the timber harvesting land base. However, sensitivity analysis, which examined the effect of reducing the timber harvesting land base derived for the base case by 5 percent, indicated that the initial harvest level of 2 615 000 cubic metres per year could be maintained for 9 decades before declining to a long-term harvest level of 2 166 000 cubic metres per year.

In the OSLRMP-revised base case, the Goal 1 and Goal 2 protected areas and PAS corridor were excluded from the timber harvesting land base. In this analysis, the initial harvest level of 2 615 000 cubic metres per year could still be maintained for 8 decades before declining directly to a long-term harvest level of 2 076 000 cubic metres per year. I note that the results of the sensitivity analysis based upon the original base case was similar to the OSLRMP-revised base case forecast in which the protected areas were excluded from the timber harvesting land base.

A sensitivity analysis that examined the effect of decreasing the size of the timber harvesting land base assumed in the OSLRMP-revised base case was also provided. In this analysis, decreasing the size of the timber harvesting land base by a further 5 percent resulted in a decline in the initial harvest level of 2 615 000 cubic metres per year after 6 decades rather than after 8 decades. The long term harvest level also decreased from 2 076 000 cubic metres per year by about 3 percent to 2 005 000 cubic metres per year.

From discussions with BCFS staff regarding these areas, I am satisfied that management of the areas is being handled at the operational level in a manner consistent with their intended status, and that the resource values are not at risk.

Having considered the information regarding protected areas, I am satisfied that the Goal 1 protected areas, which have received government approval, were appropriately excluded from the OSLRMP-revised base case. However, the OSLRMP-revised base case also excluded approximately 990 hectares attributable to Goal 2 protected areas, which have not yet received government approval and fully excluded 690 hectares attributable to the PAS corridor. BCFS district staff have noted some uncertainty regarding the size and constraints on Goal 2 protected areas and the PAS corridor. As discussed under "Guiding principles for AAC determinations", it would be inappropriate to attempt to speculate on the timber supply impacts that will eventually result from land-use decisions that have not yet been fully taken by government. Therefore, I conclude that the OSLRMP-revised base case inappropriately excluded these areas from the timber harvesting land base. In total, the Goal 2 protected areas and the PAS corridor represent less than 0.1 percent of the timber harvesting land base.

Therefore, given the small size of the area and the stability of timber supply for the first 80 years, as evidenced by the various sensitivity analyses, I am satisfied that there are no implications to timber supply of having excluded these areas and make no adjustments for this determination.

Existing forest inventory

- current inventory

The forest inventory data used for the timber supply analysis was based on an inventory of the Okanagan TSA that was completed between 1968 and 1979. The inventory was updated to 1996 to account for harvesting disturbances, growth, and silviculture treatments. The rationale for the 1996 AAC determination stated that a re-inventory of the TSA was scheduled to occur in 2000; however, funding shortfalls have prevented this from occurring.

In 1997, an audit was completed for the Okanagan TSA on the mature, immature and non-forest components of the inventory. The audit found no statistically significant problems with volume estimates. The audit did not specifically report on the accuracy of forest cover labels with regards to tree species and BCFS district staff indicate that in numerous instances the species composition for individual stands have changed since the original inventory due to forest succession. I will discuss the results of the audit further under *site productivity estimates.*

The results of an inventory audit of lodgepole pine and cedar/hemlock problem forest types were discussed above under *problem forest types*.

Public submissions were received from the SEAS, the CES, the Little Shuswap Indian Band (LSIB), the Turtle Island Earth Steward (TIES), and MELP expressing concern regarding the age and reliability of the inventory data.

The forest inventory for the Okanagan TSA is one of the oldest in the province and district staff are currently pursuing funding to complete a new inventory. District staff state that the age of the inventory creates some uncertainty about the volumes and species composition described for existing stands by the inventory data.

Although I am aware of the concerns of the district, I note that the audit results indicate the inventory volumes on the whole are acceptable, and therefore for this determination I accept that the inventory provides the best information available from which to determine volume estimates.

However, I am fully supportive of the districts' assessment that a new forest inventory is a high priority for the Okanagan TSA. I recognize that inventories are costly and that funding for such a large project is limited. Consequently, I strongly encourage district staff to pursue agreements or partnerships with the TSA licensees, through the Innovative Forest Practices Agreement (IFPA) or FRBC, to secure funding for this project. It is essential that the information on which so many forest management decisions are based, be upgraded to a level which provides a greater level of certainty for application by both licensees and government.

- volume estimates for existing stands

The Variable Density Yield Prediction (VDYP) model version 6.4a, developed and supported by the Ministry of Forests Resources Inventory Branch, was used to estimate timber volumes for existing natural stands older than 20 years for the timber supply analysis, and for regenerating partially harvested stands of dry-belt Douglas-fir. As discussed under *current inventory*, an inventory audit of mature stand volumes conducted in 1997 indicated that the volumes were statistically acceptable. For this determination, I have considered the volume estimates for existing stands as represented in the timber supply analysis to be the best available information and I have made no adjustments for this factor.

Expected rate of growth

- site productivity estimates

Inventory data includes estimates of site productivity for each forest stand, expressed in terms of a site index. The site index is based on the stand's height as a function of its age. The productivity of a site largely determines how quickly trees grow. This in turn affects the time seedlings will take to reach green-up conditions, the volume of timber that can be produced in regenerated stands and the ages at which a stand will satisfy mature forest cover requirements and reach a merchantable size.

In general, in British Columbia, site indices determined from younger stands (i.e., less than 31 years old) and older stands (i.e., over 150 years old) may not accurately reflect potential site productivity. In young stands, growth often depends as much on recent weather, stocking density and competition from other vegetation, as it does on site quality. In old stands, which have not been managed for stocking density, the trees used to measure site productivity may have grown under intense competition or may have been damaged, and therefore may not reflect the true growing potential of the site. This assumption has been verified in several areas of the province where studies—such as the old-growth site index or OGSI project—suggest that actual site indices may be higher than those indicated by data from existing old-growth forests. In recent years it has been consistently concluded from such studies that site productivity has generally been underestimated; managed forest stands tend to grow faster than projected by inventory-based site index estimates from old-growth forests.

None of the recent site productivity studies provide information specific to the Okanagan TSA. However, for a sensitivity analysis the results from provincial OGSI studies were used to adjust the site indices of stands greater than 140 years of age, which comprise 35 percent of the timber harvesting land base. An analysis that examined the effects of the site index adjustment on the OSLRMP-revised base case indicated that the short-term timber supply level could be maintained for 7 decades before decreasing to a long-term harvest level of 2 523 000 cubic metres per year, which is 22 percent higher than the unadjusted long-term harvest level.

Several submissions were received from the public noting that OGSI studies only provide an indication of the potential of managed stands, i.e., stands in which spacing, pests, cattle etc. are properly controlled. Other submissions received indicated that using unadjusted site indices in the formulation of the base case was overly conservative in view of the results of provincial studies.

In summary, I have reviewed and discussed the information regarding site productivity estimates with BCFS staff and I have concluded based on the results of province-wide studies that site indices for managed stands in the Okanagan TSA are most likely underestimated. However, the provincial site index results provide an indication of the potential increase under ideal circumstances. The actual productivity of the Okanagan TSA most likely lies between that projected in the unadjusted OSLRMP-revised base case and that projected in the sensitivity analysis. This re-emphasizes the need for a better understanding of the inventory and site productivity, and I strongly encourage BCFS staff to pursue this issue further, subject to the availability of funding.

Based on these considerations, I am prepared to accept that the base case projection was based on conservative estimates of site productivity. This results in an unquantified upward pressure that will affect the mid- to long-term timber supply, and I have accounted for this in my determination, as discussed in 'Reasons for decision".

- volume estimates for regenerating stands

In the analysis, the TIPSY growth and yield model was used to estimate volumes for managed stands. Managed stands for the TSA were defined as all existing stands 20 years of age or less, and all stands regenerated in the future. The managed stand yield tables were

reviewed and approved by BCFS Timber Supply Branch staff with growth and yield expertise and found to be appropriate for use in this analysis.

Submissions received from Riverside and Shuswap Okanagan Forest Association (SOFA) suggested that all planted stands less than 30 years of age should have been assumed to be managed. District staff inform me that there are noted deficiencies in some of the older plantations based on the quality of the planting stock that was available at the time of planting and differences in stand tending activities. In any event, BCFS district staff indicate that the area represented by stands 20 to 30 years old is very small.

The Forest Practices Code requires the use of improved (class A) seed from seed orchards for regeneration where available. Class A seed is the product of British Columbia's forest genetics program, which uses standard domestication/breeding techniques to select naturally-occurring and well performing trees.

Class A seed has been used for reforestation on this TSA for a number of years. Based upon the current genetic gains for class A lodgepole pine (7 to 11 percent) and spruce (4 to 8 percent), and the proportion of improved seed being sown on the TSA, future stand yields are expected to increase by about 5.5 percent.

A sensitivity analysis that examined the effect on the OSLRMP-revised base case timber supply of increasing the yields of regenerating stands by 10 percent indicated that the initial harvest level of 2 615 000 cubic metres per year could be maintained for an additional decade before declining to a long-term harvest level of 2 283 000 cubic metres per year—10 percent higher than that in the OSLRMP-revised base case. Decreasing regenerating stand yields by 10 percent resulted in a decrease in the short-term harvest level one decade earlier than in the OSLRMP-revised base case to the mid-term level and resulted in a long-term harvest level of 1 906 000 cubic metres—8 percent lower than in the OSLRMP-revised base case.

Based upon my review and discussion of the information regarding volume estimates for regenerating stands with BCFS district staff, I have concluded that the assumptions for managed stands are reasonable. Any uncertainty regarding stands between 20 to 30 years of age would only result in a very small change in the total volume and in any event would only affect the long-term timber supply.

The use of class A lodgepole pine and spruce seed represents an increase—in aggregate 5.5 percent—in the productivity of regenerating stands on the TSA. For this determination, this represents an increase in the long-term timber supply, and to a lesser extent an increase in the mid-term timber supply, and I have accounted for this in my decision as discussed in 'Reasons for decision'.

- operational adjustment factors (OAF)

TIPSY projections are initially based on ideal conditions, assuming full site occupancy and the absence of pests, diseases and significant brush competition in the stand. Certain operational conditions, such as less than ideal tree distribution, small non-productive areas, endemic pests and diseases, or age dependent factors such as decay, waste and breakage

may cause yields to be reduced over time. Operational adjustment factors (OAFs) are applied to yields generated using TIPSY to account for losses of timber volume as a result of these operational conditions. OAF 1 can account for factors affecting the yield curve across all ages, such as small stand openings. OAF 2 can account for factors whose impacts tend to increase over time, such as pests, disease, decay, waste, and breakage, whose influence on a stand may often be reduced through management practices.

In the analysis, the standard provincial reductions of 15 percent for OAF 1 (accounting for less than ideal tree distribution, small non-productive areas, endemic pests and disease, and random risk factors such as windthrow), and 5 percent for OAF 2 (accounting for decay, waste and breakage) were applied to all lodgepole pine stands, and some dry-belt Douglas-fir and balsam stands. Balsam and spruce stands growing on good and medium sites received an OAF 1 of 20 percent and OAF 2 of 0 percent. For regenerating cedar- and hemlock-leading stands and wet-belt Douglas-fir stands in which root disease is endemic, BCFS Kamloops Region staff derived volume estimates based on an expert review of ICH stands within the Okanagan TSA, further to my instructions in the rationale for the 1996 AAC determination. For these stands, which represent about 11 percent of the timber harvesting land base, OAF 1 and OAF 2 values were derived using the estimates for expected volume, and then applied in the analysis to approximate the impact of endemic root rots in these stands. For some of these species groups, the OAFs are substantially higher than in most areas of the province; however, since they are based upon an expert review of the productivity of regenerating stands, I accept them as the best available information.

Yields for selection-harvested dry-belt Douglas-fir stands were projected using VDYP, (i.e., they were based upon natural yield curves). Therefore, to the extent that growth is being impeded by endemic root disease, it has already been incorporated in the development of these yield curves.

A sensitivity analysis was prepared using the standard provincial reductions for OAF 1 and OAF 2 for all regenerating stands. The results indicated an increase in the mid- to long-term timber supply from 2 076 000 cubic metres per year in the OSLRMP-revised base case to 2 236 000 cubic metres per year, about 8 percent higher.

Several submissions were received from the forest industry expressing concern that the OAF values used in managed (regenerating) stands were inappropriate and based upon incorrect assumptions regarding the yields and management practices in regenerating stands subject to root rot.

In conclusion, the OAFs assumed in this analysis are higher than those used in other management units; however, they are based upon an expert review of the productivity of regenerating stands subject to root disease. For this determination, I accept that the OAFs on which the timber supply was based represent the best information available and are adequate for use in this determination. In any event, any uncertainty regarding OAFs used in the analysis effect timber supply in the mid to long term and I will consider any new empirical evidence regarding these values at the next determination.

- minimum harvestable age

A minimum harvestable age (MHA) is an estimate of the earliest age at which a forest stand has reached a harvestable condition and has met minimum merchantability criteria. The MHA assumption largely affects when second growth stands will be available for harvest. In practice, many forest stands will be harvested at older ages than the MHA, due to economic considerations and constraints on harvesting that arise from managing for other forest values such as visual quality, wildlife and water quality.

For this analysis, the MHA was assumed to be 100 years for all species except lodgepole pine, for which the MHA was assumed to be 80 years. The MHAs were based upon district priorities and input from local forest industry representatives. Submissions were received that expressed concern regarding the lack of criteria for determining MHA that recognized differences in site productivity between stands and between existing and regenerating stands (see *site productivity estimates*).

Sensitivity analysis that examined the effect on the original base case of increasing or decreasing the MHA by 10 percent resulted in changes in mid-term timber supply but had no effect on the long-term timber supply. In the mid term, decreasing the MHA by 10 percent allowed the initial harvest level of 2 615 000 cubic metres to be maintained for an additional decade; whereas, increasing the MHA by 10 percent resulted in the initial harvest level being maintained for one decade less. No similar sensitivity analysis was available to assess the effect of changes in MHA on the OSLRMP-revised base case. However, I have no reason to believe that the fundamental interactions that influence MHA in the OSLRMP-revised base case would differ to any significant extent from the original base case.

For this determination, I am satisfied that the timber supply analysis used the best available information. Nevertheless, I note the concerns raised regarding the MHA of regenerating stands and I request that the BCFS district staff refine the criteria used to establish MHA for consideration at the next determination.

(ii) the expected time that it will take the forest to become re-established on the area following denudation;

Forest re-establishment

- regeneration delay

Regeneration delay is the period between harvesting and the time at which an area becomes occupied by a specified minimum number of acceptable, well-spaced seedlings. In timber supply analysis, regeneration delay is used to determine the starting point of tree growth for the yield curves that project volumes over time.

The *Okanagan TSA Data Package and Information Report* incorrectly reported a regeneration delay of four years. For this analysis, a two-year regeneration delay was assumed in the timber supply analysis for both planted and naturally regenerated sites. BCFS district confirm that the assumptions regarding regeneration delay are representative

of current practice in the TSA. Based upon my review of the information regarding regeneration delay, I am satisfied that there are no issues that would impact on this determination.

- impediments to prompt regeneration

Impediments to prompt regeneration that are not accounted for in the analysis could increase the uncertainty in the growth and yield assumptions used in the timber supply analysis.

Potential impediments to prompt regeneration in the TSA include brush competition, damage due to grazing cattle, and difficulties regenerating higher elevation sites. In order to address these concerns, BCFS district staff place a high priority on manual brushing of brush-prone sites, preparing range plantation protection plans, and monitoring the regeneration of higher elevation sites. At this time, free-growing requirements are being met on all sites. I have reviewed the information on regeneration impediments and am satisfied that there are no issues that would impact this determination.

- not-satisfactorily-restocked (NSR) areas

Not-satisfactorily-restocked (NSR) areas are those areas where timber has been removed, either by harvesting or by natural causes, and a stand of suitable forest species and stocking has yet to be established. Where a suitable stand has not been regenerated and the site was harvested prior to 1987, the classification is 'backlog' NSR. There are no backlog NSR stands on the TSA at this time. All other NSR is considered 'current' NSR.

Review of the forest inventory files for the TSA indicated a total of 40 459 hectares of NSR in the TSA. For the purpose of estimating NSR area, the major licensee silviculture information system (MLSIS) and the integrated silviculture information system (ISIS) records are considered more current than the information from the forest inventory files. A review of the MLSIS and ISIS records showed 12 607 hectares of NSR. Therefore, these hectares were assumed to be current NSR and were assigned an age of negative 2 years in the analysis to account for the time taken for regeneration in the model (see *regeneration delay*). The remaining hectares from the forest inventory files were re-assigned a leading species (if required) and an age of 2 years, as they were assumed to be satisfactorily restocked.

BCFS district staff indicate that the estimate of current NSR is reasonable and agree with the reconciliation of the forest inventory and silvicultural record information.

I note that the estimation of 12 607 hectares of current NSR is consistent with the estimated regeneration delay on the Okanagan TSA. Based on my review of the information, I accept that NSR areas have been appropriately accounted for in the analysis.

(iii) silvicultural treatments to be applied to the area:

Silvicultural systems

For the analysis, all harvesting was assumed to be done using clearcutting silvicultural systems (i.e., removal of all of the volume associated with the area harvested) except for approximately 48 000 hectares of dry-belt Douglas-fir, in which partial harvesting was assumed. Other requirements under the Forest Practices Code for riparian reserves and wildlife tree patch areas, as well as forest cover constraints such as green-up and adjacency restrictions were also factored into the analysis and are discussed further under the appropriate sections in this rationale.

Volume projections for the areas of dry-belt Douglas-fir in which partial harvesting is assumed to occur were modelled by assuming that one-third of the volume in the stands would be removed during each harvest, with a minimum 30-year period between harvests. Partial harvesting also occurs in visually sensitive areas; however, the implications to timber supply of management in these areas was accounted for by the application of forest cover objectives (see *visually sensitive areas*).

For this analysis, BCFS district staff identified dry-belt Douglas-fir stands using biogeoclimatic classification to the variant level rather than on the basis of forest cover information. As a result the area assumed to be partially harvested in the analysis was reduced from the level assumed in the 1996 timber supply analysis (118 000 hectares) to 48 000 hectares.

MELP staff questioned the decrease in the size of the dry-belt Douglas-fir zone. They noted that stands on southern and western aspects of some of the excluded biogeoclimatic zone variants should have been included in the dry-belt Douglas-fir zone assumed in the analysis. For the next timber supply analysis, MELP staff have requested that the assumptions regarding the dry-belt Douglas-fir zone be reviewed.

I have reviewed and discussed the information regarding silvicultural systems with BCFS and MELP staff. For this determination, I note that the change in the area assumed to be partially harvested is the result of using an improved methodology for identifying dry-belt Douglas-fir stands. Therefore, I conclude that the assumptions regarding silvicultural systems are appropriate for use in this determination. I look forward to reviewing any new empirical information regarding the assumptions used in identifying dry-belt Douglas-fir stands, and I encourage BCFS and MELP staff to investigate this further, subject to the availability of funding.

Incremental silviculture

In general, incremental silviculture includes activities such as commercial thinning, juvenile spacing, pruning, and fertilizing that are beyond the basic silviculture activities required to establish a free-growing forest stand.

Review of incremental silviculture activities conducted over the past 5 years in the Okanagan TSA indicated that juvenile spacing, fertilization, and pruning had been carried out in stands covering 8155 hectares, 234 hectares and 3407 hectares respectively. As these

areas are relatively small, no incremental silviculture was assumed in the timber supply analysis; however, regeneration assumptions reflect density control for regenerating stands.

I have reviewed the assumptions regarding juvenile spacing, fertilizing, and pruning with BCFS district staff. While the activities were not explicitly modelled, I am satisfied that the level of activity was enough to result in negligible timber supply impacts. As a result, I am satisfied that they are adequate for use in this determination.

Commercial thinning

In the Okanagan TSA timber supply analysis, no commercial thinning was assumed.

BCFS district staff have informed me that a pilot program is currently underway that is anticipated to result in the harvesting of overstocked pine stands (stocking class 4) and the re-establishment of well-spaced stands. At present, these stocking class 4 stands are excluded from contributing to the timber harvesting land base and to the extent that these stands will not be required for conservation purposes, conversion of these stands may be of some benefit to future timber supply.

Commercial thinning is a minor activity in the Okanagan TSA and for this determination I consider the assumption in the analysis of no commercial thinning activity to be appropriate. I note that there is some work underway in class 4 stands that may result in these stands contributing to future timber supply.

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area:

Utilization standards

Utilization standards define the species, dimensions and quality of trees that must be harvested and removed from an area during harvesting operations. In the timber supply analysis, the utilization standards assumed in the base case for most species were a minimum 17.5-centimetre diameter at breast height (dbh) with a 30-centimetre maximum stump height and 10-centimetre minimum top diameter inside bark. For lodgepole pine stands, the minimum dbh standard used was 12.5 centimetres.

District staff have indicated that these assumptions are consistent with regional standards. They note that operationally, the utilization standard for mature western redcedar is relaxed to a 15-centimetre minimum top diameter inside bark. As I have noted in rationales for other determinations, a review of this issue has shown that this difference in utilization standards has a negligible impact on timber supply.

I am satisfied that the utilization standards applied in the analysis are reasonably reflective of current practice, and make no adjustments in this regard.

Decay, waste and breakage

The estimation of volumes using VDYP for existing stands incorporates the loss of volume due to decay, waste and breakage. To account for decay, volume losses are incorporated

directly into the volume estimates, while standard waste and breakage factors are applied in the analysis in the development of VDYP yield curves. These estimates of losses have been developed for different areas of the province based on field samples. For regenerated stands, as discussed in *volume estimates for regenerating stands*, the TIPSY projections incorporate OAFs that account for anticipated decay, waste and breakage.

In the timber supply analysis for the Okanagan TSA, the standard decay, waste and breakage criteria were applied. I am satisfied that losses due to decay, waste, and breakage have been accounted for based on the provincial loss factors, and have made no adjustment to the assumptions applied in the analysis.

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production:

Integrated resource management objectives

The Ministry of Forests is required under the *Ministry of Forests Act* to manage, protect and conserve the forest and range resources of the Crown and to plan the use of these resources so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated. Accordingly, the extent to which integrated resource management (IRM) objectives for various forest resources and values affect timber supply must be considered in AAC determinations.

To manage for resources such as water and visual quality, current harvesting practices limit the size and shape of cutblocks and maximum disturbances (areas covered by stands of less than a specified height), and prescribe minimum green-up heights required for regeneration on harvested areas before adjacent areas may be harvested. Green-up requirements provide for a distribution of harvested areas and retention of forest cover in a variety of age classes across the landscape.

- cutblock adjacency and green-up

Objectives for forest cover and cutblock adjacency guide harvesting practices in order to address resource values such as wildlife habitat and visual quality. The adjacency objectives modelled in the analysis address minimum green-up height required before an adjacent area may be harvested, and the maximum area permitted to be covered with stands less than the minimum green-up height.

In the analysis, the age to green-up was derived from BCFS height growth curves using the minimum heights for each of the zones. A 2-metre green-up height (based on silviculture height) was applied in the IRM portion of the landbase for the OSLRMP analysis, and a 3-metre green-up height was used in the original base case. No more than 30 percent of the stands in this zone could be less than green-up height at any one time.

BCFS district staff agree that the height assumptions for the IRM zone adequately reflect current practice.

For this determination, I accept that green-up requirements in the IRM areas were modelled appropriately and make no adjustments on account of this factor.

- visually sensitive areas

Careful management of scenic areas visible from communities, public use areas and travel corridors is an important resource management objective. The Forest Practices Code enables the management of visual resources by providing for scenic areas to be identified and made known, and by providing for the establishment of visual quality objectives (VQOs). To achieve this, visual landscape inventories are carried out to identify, classify and record visually sensitive areas. On completion of such an inventory, a specialist may derive recommended visual quality classes (RVQCs, i.e.: 'Preservation'; 'Retention'; 'Partial retention'; 'Modification' or 'Maximum Modification') to identify levels of alteration that would be appropriate for particular areas. The Forest Practices Code requires these areas to be identified, by the district manager or in a higher level plan, and to be made known to licensees. When this has been done and an RVQC has become current practice, it may be incorporated into a timber supply analysis, preferably as a VQO established by the district manager or contained in a higher level plan. Established VQOs reflect the desired level of visual quality, based on the physical characteristics and social concern for an area, and seek to balance the perceptions and needs of people with the social and economic needs of the province.

Managing for visual resources is particularly important in the Okanagan TSA due to the significance of tourism to the region. A visual landscape inventory was completed for the TSA in 1998. Based upon the results of this inventory, areas were identified as known scenic areas by the district managers with established and recommended VQOs (*Okanagan TSA Integrated Resource Management Timber Harvesting guidelines*, 1992).

To achieve objectives for visual quality, limits are placed on the amount of visible disturbance that is acceptable in visually sensitive areas. These limits act to constrain timber harvesting, road building, and other forest practices. Guidelines to meet VQOs include setting a maximum percentage of a visual landscape allowed to be in a disturbed state at any one time, and setting visually effective green-up (VEG) targets that must be achieved before additional harvesting is permitted. VEG refers to the stage at which a stand of forested timber is perceived by the public to be satisfactorily greened-up from a visual standpoint.

Provincial guidelines provide a range of values for maximum disturbance in each visually sensitive area. The applicable disturbance value within the range is dependent on the visual absorption capacity (VAC) of the area, which is a measure of an area's physical capacity to absorb alterations while maintaining its visual integrity. An area with a low VAC can sustain relatively less disturbance than an area with a high VAC before the visual condition is compromised.

In the original base case, 264 993 hectares of productive forest land were identified as visually sensitive, including 70 796 hectares of timber harvesting land base. Forest management practices in visually sensitive areas were modelled using a maximum percentage area within each visual landscape polygon that could be below the VEG height

assigned to that polygon. VEG heights were determined based upon the RVQC (preservation, retention, partial retention, or modification) and VAC (high, medium, or low) for each visual management polygon.

Sensitivity analysis indicated that increasing the allowable visual disturbance assumed in the base case by 10 percent resulted in the initial harvest level being maintained for 2 decades longer and a 4 percent increase in the long-term harvest level. Decreasing the allowable visual disturbance assumed in the base case resulted in the initial harvest level being maintained for 12 decades rather than 14 decades; however, there was no effect on the long-term harvest level.

The OSLRMP has classified the plan area into three visual landscape management zones, based upon the relative visual importance and type of use of areas within the zone. Visual management zone 1 areas will be declared scenic areas with established VQOs under the Forest Practices Code and will require visual impact assessments. Zone 1 encompasses a total of 287 149 hectares, of which 126 617 hectares are timber harvesting land base. Visual management zone 2 areas are not scenic areas as defined under the Forest Practices Code, and they do not have established VQOs. The main focus in these areas is on designing and implementing resource management activities that blend with the natural landscape. The zone 2 area encompasses a total of 157 998 hectares, of which 127 272 hectares contribute to the timber harvesting land base. Visual management zone 3 areas are areas that have been identified by commercial and non-commercial recreation users as requiring visual management of foreground areas visible from hiking and riding trails, and are not necessarily related to specific viewpoints.

District staff have indicated that the management requirements for areas within zones 2 and 3 are not anticipated to have any effect on timber supply. However, they do note that the increase planning requirements associated with areas in zone 2 may result in the delay of approvals for operational plans for areas that are being developed.

In the OSLRMP-revised base case, the zone 1 visual management areas were modelled in a similar manner to the known scenic areas in the original base case, using the VQOs outlined in the OSLRMP. The OSLRMP has increased the area of timber harvesting land base subject to visual constraints by 92 952 hectares; however, the VEG requirements have been decreased.

I note that the zone 1 visual management areas are larger than the areas identified as known scenic areas prior to the OSLRMP and that the zone 1 areas are subject to lower VEG height requirements. BCFS district staff indicate that to the extent that there is any uncertainty with regards to the implementation of the OSLRMP objectives for visually sensitive areas, the analysis does not indicate any changes in the short-term timber supply. Therefore, while there may be some uncertainty as to the exact implementation of the OSLRMP objectives for visually sensitive areas, I am satisfied that the assumptions made in the OSLRMP base case are generally adequate for use in this determination.

- lakeshore management zones

The Okanagan TSA contains many lakes including the Okanagan, Shuswap, Osoyoos, Mabel, Sugar, Kalamalka, Wood, Vaseux, and Skaha lakes. Lakes within the TSA were

classified according to the Forest Practices Code and the *Lakeshore Classification and Lakeshore Management Guidebook, Kamloops Forest Region* 1996.

A 210-metre wide Lakeshore Management Area —including a 10-metre Riparian Reserve Zone (RRZ) and a 200-metre Lakeshore Management Zone —has been established around classified lakes within the Okanagan TSA.

In the analysis, the lakeshore management zone covers about 14 700 hectares of the timber harvesting land base. The 10-metre wide RRZ, in which no timber harvesting occurs, was excluded from contributing to the timber harvesting land base (see *riparian areas*). The 10-metre wide RRZ timber harvesting exclusion was also incorrectly applied to the Crown land portion of lakes greater than 1000 hectares in size. This resulted in a 360-hectare underestimation in the size of the timber harvesting land base.

Each lakeshore management zone is assigned a visual quality objective based upon the classification of the lake as a class A, B, C, or D lake. According to the *Lakeshore Classification and Lakeshore Management Guidebook*, class A, B, C, and D lakes are assigned a preservation, retention, partial retention, and modification visual quality objective respectively. The OSLRMP-revised base case used the same forest cover objectives for lakeshore management zones as were used for the visually sensitive areas (see *visually sensitive areas*) to reflect current management in these zones.

The OSLRMP visual quality guidelines recommend changes to the levels of harvesting permitted under each visual quality objective. Application of these revised visual quality objectives to the lakeshore management zones could potentially increase the harvesting levels within these zones, which is a change from current practice. The OSLRMP has recommended that inconsistencies between the *Lakeshore Classification and Lakeshore Management Guidebook* and the OSLRMP visual quality guidelines should be reviewed and final recommendations made to the OSLRMP implementation and monitoring committee (monitoring committee). District staff indicated at the time of this determination that there had been little or no harvesting in the class A lake lakeshore management zones.

I have reviewed the information regarding lakeshore management zones in the Okanagan TSA. I recognize that there may be some uncertainty as to the levels of disturbance that will be allowed in these zones in the future once implementation of the OSLRMP is complete. However, any changes in forest management that result from the review undertaken by the OSLRMP monitoring committee can be factored into future analyses. In any event, what was modelled in the OSLRMP-revised base case was consistent with current practice. For this determination, I am satisfied that the assumptions made in the analysis are generally adequate for use in this determination.

- cultural heritage resources

Under the *Forest Act*, a cultural heritage resource means 'an object, a site or the location of a traditional societal practice that is of historical, cultural or archaeological significance to British Columbia, a community or an aboriginal community.' Archaeological sites contain physical evidence of past human activity, whereas traditional use sites may not necessarily contain historical physical evidence but may indicate current use by a First Nation.

As a first step in the management and conservation of archaeological resources in the Okanagan TSA, an archaeological overview assessment (AOA) was completed in 1997. However, the data is at a very small scale and further work is required to refine the probability of finding sites. As a consequence, these results were not directly incorporated into the analysis for this determination.

The AOA is one of the tools available to the statutory decision maker to identify areas within the TSA that may require additional investigation in the form of an Archaeological Impact Assessment (AIA). Archaeological information is being collected where the statutory decision maker has deemed it necessary.

BCFS district staff estimate the number of archaeological sites in each of the forest districts within the Okanagan TSA are as follows: 124 sites within the Salmon Arm Forest District, 177 sites within the Vernon Forest District, and 655 sites within the Penticton Forest District. After accounting for the exclusion of area to account for other factors, only 37 sites, which represent a total area of 11 hectares, overlapped with stands within the timber harvesting land base.

BCFS staff indicate that when archaeological sites are found, the archaeologists make several management recommendations on how to deal with the area. The final report, including management recommendations, is forwarded to the Archaeology Branch for review. The final management recommendations from Archaeology Branch are incorporated into the silvicultural prescription. At this time, data has not been gathered as to the net down impacts of deleting or logging around an archaeological site (see *First Nations considerations*), although experience to date in the province has shown a minimal impact on the timber harvesting land base and subsequent timber supply projection. Nonetheless, it is incumbent on the district managers to properly reflect these sites in any of their operational decisions.

Traditional use studies (TUS) have been completed for the Adams Lake/Neskonlith Indian bands, as well as the Little Shuswap Indian Band. The Westbank First Nation has been gathering traditional use information through their involvement in the treaty process. BCFS staff note that a process has yet to be developed to address how traditional use information should be shared between BCFS district staff and First Nations

In consideration of the information regarding cultural heritage resources, I am satisfied that no immediate risk is posed to the archaeological resource as a result of the analysis assumptions, and that no explicit adjustment is required to account for this factor in this determination. These areas are being managed appropriately at the operational level. I recommend that BCFS staff continue to work with First Nations in identifying cultural heritage resources and encourage the development of a process to facilitate an exchange of information regarding traditional use information. If ongoing management for cultural heritage resources begins to impact operations, then it will be accounted for in a future determination.

- community watersheds

Guidelines for forest practices for hydrological recovery in community watersheds are found in the *Interior Watershed Assessment Plan Guidebook*. At the time the *Okanagan*

Timber Supply Area Analysis Report was released, there were 47 community watersheds in the TSA, that occupied about 20 percent of the timber harvesting land base.

For the analysis, the requirements for hydrological recovery allowed 20 percent of the productive area within community watersheds to be covered by stands of trees less than 6 metres in height.

Since the release of the analysis report, three additional watersheds have been designated in the Salmon Arm Forest District, increasing the proportion of timber harvesting land base in community watersheds by just under 0.5 percent. These additional watersheds were included in the OSLRMP-revised base analysis and were subject to the same forest cover objectives described above.

Interior Watershed Assessment Plans (IWAPs) have been completed for many of the community watersheds in the Okanagan TSA. BCFS district staff have reviewed the assumptions used in the analysis regarding community watersheds and believe they are consist with the recommendations in the IWAPs and are an accurate reflection of current practice.

A sensitivity analysis was prepared that examined the effect on timber supply of increasing or decreasing the percentage of productive forested area in community watersheds that could be covered in stands younger than 28 years old—the average age at which stands have achieved a height of 6 metres— by 5 percent. The results indicated that changes of this magnitude had no effect on the current or future timber supply projected in the analysis.

Riverside expressed concern that the maximum disturbance used in the analysis was not the same as the current Community Watershed Guidebook recovery curve method. I have reviewed the approach used in this analysis and have concluded that it provides a reasonable representation of the guidelines for community watersheds.

Riverside also expressed concern regarding the accuracy of the community watershed boundaries as they have found the boundaries for the Sicamous/Wiseman areas to be incorrect. I note that the boundaries used in the analysis were based upon the MELP Watershed Atlas for stream networks, lakes and wetlands, community watershed polygons, and fish inventory data, which is considered to be the best available information.

In conclusion, I recognize that there may be some uncertainty regarding the exact boundaries of community watersheds; however, the assumptions in the analysis were based upon the best currently available information. In any event, the results of the sensitivity analysis, which examined the effect of decreasing the size of the timber harvesting land base by 5 percent, indicated that timber supply is not sensitive to changes of this magnitude. Therefore, I accept the assumptions regarding community watersheds incorporated in the OSLRMP-revised base case analysis are adequate for use in this determination.

- riparian areas

Riparian areas occur along streams, around lakes and in wetlands. The *Riparian Management Area Guidebook* requires the establishment of riparian reserve zones (RRZ)

that exclude timber harvesting in some cases, and riparian management zones (RMZ) that restrict timber harvesting in order to protect riparian and aquatic habitats.

Comprehensive local stream and fish habitat inventories were not available for the TSA. For the analysis, average interior stream length and class information contained in the report prepared by Wild Stone Resources, entitled *Riparian Impact Assessment*, were used to derive the land base reductions required to account for RRZs and RMZs. A total reduction of 37 677 hectares or 3.6 percent of the timber harvesting land base was applied in the analysis.

The OSLRMP-revised base case incorporates the additional enhanced riparian reserves recommended in the OSLRMP, which represent a total area of approximately 10 000 hectares timber harvesting land base.

BCFS district staff confirm that the reductions applied for RRZs and RMZs in the analysis adequately reflect current practice. I am familiar with the data upon which the values used in the analysis were based, and note that the average interior values have been found to correlate well for RRZs and RMZs in other interior units. I am therefore satisfied that the analysis used the best available information for estimating riparian reserve and management zones, and make no adjustments on this account.

- wildlife habitat

There are approximately 30 red-listed and blue-listed vertebrates in the Okanagan TSA that are associated with forested ecosystems, or forest attributes (e.g., coarse woody debris). A list of rare vertebrates is provided in the *Okanagan TSA Timber Supply Analysis Report* (July 2000). For wildlife species in the Okanagan TSA there are various requirements for habitat management, as summarized in the following sections.

1) mule deer

The OSLRMP recommends revised forest cover constraints for areas within the mule deer winter range resource management zone, which includes the areas previously established as ungulate winter range under the *Okanagan Timber Harvesting Guidelines*.

The mule deer resource management zone covers a total of 213 192 hectares of Crown forest, of which 128 279 hectares contribute to the timber harvesting land base. Forest cover constraints for the mule deer resource management zone have been developed on the basis of snow pack. In the shallow snow pack zone, 15 percent of the stands are required to be older than 140 years of age. In the moderate snow pack zone, 33 percent of stands are required to exceed specific minimum age requirements and up to 50 percent of this forest cover requirement can be met by stands located outside of the timber harvesting land base that exceed 120 years of age, while the remaining 50 percent of this requirement must be met by stands located within the timber harvesting land base that exceed 175 years of age. In the deep snow pack zone, 60 percent of stands growing on Crown land are required to be older than 100 years of age.

Once the OSLRMP has been fully implemented, forest cover requirements for mule deer winter range will be spatially distributed over 200–400 hectare units (planning cells). Mapping of planning cells had not been completed at the time of this analysis; therefore,

forest cover constraints were modelled on the basis of landscape unit and biogeoclimatic zone variant (LU/BEC).

BCFS staff indicate that the areas identified as mule deer winter range in the OSLRMP are similar to the ungulate winter range areas identified through the *Okanagan Timber Harvesting Guidelines*. Furthermore, district staff expect that planning cell information will be available September 2001 for incorporation into the 2002 Forest Development Plans. Given the BCFS and MELP commitment to implement the forest cover objectives recommended in the OSLRMP, I conclude that it is reasonable to assume that these requirements represent current practice in the Okanagan TSA.

However, MELP staff believe that the timber supply projected in the OSLRMP-revised base case may be overestimated due to the application of the OSLRMP forest cover constraints on a LU/BEC basis rather than at the planning cell level.

I have reviewed and discussed the information regarding mule deer winter range with BCFS and MELP staff and have concluded that there is a small element of risk introduced by basing the analysis on the LU/BEC rather than the planning cell level. This represents an unquantified downward pressure on the mid- to long-term timber supply and I have accounted for this in my determination as discussed in "Reasons for decision".

2) grizzly bear

Although identified as a species under the *Identified Wildlife Management Strategy* (IWMS), the management requirements for grizzly bear are often accounted for separately and apart from the IWMS implementation, through consideration in LRMPs.

The OSLRMP has identified about 650 000 hectares of grizzly bear habitat in the Okanagan TSA. Grizzly bear habitat is to be managed in 1000-hectare blocks, in which 10 percent of stands must exceed 19.5 metres in height. Other habitat provisions within these areas include reduced stocking densities for forage-producing stands and the retention of trees greater than 15 metres in height along one side of avalanche chutes.

For the OSLRMP-revised base case, forest cover constraints were applied on the basis of LU/BEC combination rather than the 1000 hectare units specified in the OSLRMP, as the location of the 1000 hectare units has not yet been established. Based upon estimates of grizzly bear habitat provided by MELP, forest cover requirements were applied to about 100 000 to 150 000 hectares of timber harvesting land base in the analysis. BCFS district staff advise me that they are in the process of implementing the OSLRMP recommendations for the management of grizzly bear habitat with the expectation that the 2002 Forest Development Plans will be consistent with these recommendations.

MELP staff are concerned that the forest cover objectives for grizzly bear habitat may be more constraining when they are applied to 1000 hectare units rather than on the basis of LU/BEC combinations.

Public input received from the Granby Wilderness Society requested that government "declare a moratorium on logging and road building" and that the timber-harvesting level be reduced. I note this request; however, I am basing the requirements for grizzly bear management on the recent OSLRMP direction.

I have reviewed and discussed the information regarding grizzly bear habitat with BCFS and MELP staff. I conclude that implementation of the 1000 hectare units for grizzly bear habitat may be slightly more constraining than the approach taken in the OSLRMP-revised base case. I also note that the operating impact on such a small area relative to the overall size of the Okanagan TSA is unlikely to be significant at this time. Therefore, until more detailed information suggests otherwise, I will accept the approach used in accounting for grizzly bear habitat in the OSLMP-revised base case as the best available information and as suitable for use in this determination. In any event, the relative stability of timber supply for the Okanagan TSA provides ample opportunity for analyzing the management implications of spatially locating the grizzly bear habitat requirements prior to the next determination.

3) mountain caribou

Mountain caribou, a red-listed species, are located along the northern and eastern portions of the Okanagan TSA. The OSLRMP has made the following recommendations regarding the management of mountain caribou:

1. establishment of a mountain caribou resource management zone that includes 110 301 hectares of Crown forest land, of which 62 924 hectares are located within the timber harvesting land base;
2. establishment of a mountain caribou corridor covering 17 845 hectares in which at least 30 percent of stands must exceed16 metres in height;
3. placement of 9 900 hectares of old growth management areas (OGMAS) within areas of mountain caribou winter habitat located in the timber harvesting land base;
4. research to determine the pattern of habitat use and preferences of mountain caribou, with the potential for additional reductions to the timber harvesting land base; and
5. restriction of harvesting in the mountain caribou research areas, to a maximum of 825 hectares per year in age classes 8 and 9, until the research is completed.

BCFS staff have reviewed the OSLRMP-revised base case results and indicate that the forest cover requirements within the mountain caribou corridor are fully met by stands that do not contribute to the timber harvesting land base. The effect of OGMA placement for mountain caribou will be discussed further under *landscape-level biodiversity*.

MELP staff indicate that habitat requirements for mountain caribou may result in the exclusion of up to an additional 10 000 hectares of timber harvesting land base, if research indicates that the habitat requirements are similar to those for mountain caribou in the BCFS Columbia Forest District.

For this determination, I am satisfied that the forest cover requirements within the mountain caribou corridor have been modelled appropriately. I note that the temporary deferral of harvesting within the mountain caribou research areas creates some uncertainty regarding the future size of the timber harvesting land base. However, until such time as these areas are established as permanent withdrawals from the land base, I am satisfied that the assumptions regarding these areas in the OSLRMP-revised base case are appropriate for use in this determination. I am also mindful that there is a risk of further land base

exclusions of up to 10 000 hectares depending upon the outcome of mountain caribou research and any resultant changes in forest management. In any event, I note that the OSLRMP-revised base case indicates that short-term timber supply for the Okanagan TSA is relatively stable; therefore, any new information regarding these areas can be incorporated at the next determination.

4) marten, bighorn sheep, elk, moose, and mountain goat

The OSLRMP recommends forest cover requirements for marten, bighorn sheep, elk, moose and mountain goat. Forest cover requirements for marten in the Fly Hills RMZ, which specify that at least one-third of all stands be greater than 19 metres in height, apply to 29 271 hectares of productive forest land. Forest cover requirements for bighorn sheep, elk, and moose, which require that at least one-third of all stands be greater than 16 metres in height, apply to 112 025 hectares, 4449 hectares, and 161 081 hectares of productive forest land respectively. Forest cover requirements for mountain goat, which specify that at least 10 percent of productive forest land be covered in stands of at least 150 years of age, apply to 16 081 hectares of productive forest land.

These forest cover requirements recommended by the OSLRMP were incorporated in the OSLRMP-revised base case. BCFS staff examined the results of this analysis and found that these forest cover requirements did not constrain timber supply, either because the requirements could be met on areas outside of the timber harvesting land base, through the use of planned cut and leave strips, prior to the stand attaining minimum harvestable age, or because the area constrained was very small.

BCFS district staff advise me that the assumptions regarding marten, bighorn sheep, elk, moose, and mountain goat are consistent with current management. Therefore, I am satisfied that the assumptions made in the OSLRMP-revised base case are adequate for use in this determination.

5) identified wildlife

Under the Forest Practices Code, identified wildlife are those wildlife species and plant communities that have been approved by the chief forester and deputy minister of Environment, Lands and Parks as requiring special management. As announced February 1999, the province's Identified Wildlife Management Strategy (IWMS) identifies endangered, threatened, vulnerable, and regionally significant species that do not already have existing management strategies.

Identified wildlife will be managed through the establishment of wildlife habitat areas (WHAs) and the implementation of general measures for wildlife, or through other management practices specified in higher level plans. Grizzly bear, white-headed woodpecker, bighorn sheep, and bull trout are species that MELP is considering as priorities for the placement of proposed WHAs. In the Okanagan timber supply analysis, while the establishment of several WHAs is currently in progress, these areas have not yet been established; therefore, no accounting was made for managing identified wildlife in the analysis.

For this determination, it is not possible to specify the exact location or precise amount of additional habitat that will be required within the timber harvesting land base to implement the IWMS. However, given the Province's commitment both to implement the IWMS, and to limit short-term timber supply impacts to one-percent province wide, as well as the expected occurrence of identified wildlife in this TSA, it is appropriate to account for an impact on timber supply.

The timber supply reduction is expected to be less than or equal to one percent, although at this time the exact impact is uncertain. Although no specific sensitivity analyses were conducted to evaluate the impact of this reduction, other results, such as those assessing the impact of uncertainties in the size of the timber harvesting land base, indicate that there is not likely to be any impact to short-term timber supply due to this factor alone. For this determination, I am mindful of the downward pressure and I will take this into account as discussed under 'Reasons for decision.'

- stand-level biodiversity

Biological diversity, or biodiversity, is defined as the full range of living organisms, in all their forms and levels of organization. Biodiversity includes the diversity of genes, species and ecosystems, and the evolutionary and functional processes that link them. Under the Forest Practices Code, biodiversity in a given management unit is assessed and managed at the stand and landscape levels.

Stand-level biodiversity management includes retaining wildlife trees and patches (WTPs), within or adjacent to cutblocks to provide structural diversity and wildlife habitat. Where landscape unit planning has been completed and objectives have been set, Table A3.1 in the *Landscape Unit Planning Guide* recommends retention rates for WTPs. The original base case analysis for the Okanagan TSA was initiated prior to approval of the OSLRMP and assumptions regarding the retention of WTPs were based upon Table A3.1. On the basis of these guidelines, a WTP retention value of 1.5 percent of harvestable volume was used in the original base case analysis.

The OSLRMP-revised base case assumed a WTP retention rate of 3 percent of harvestable volume and is consistent with the recommendations of the OSLRMP.

District policy prior to the approval of the OSLRMP required licensees to retain a total of 9 percent of cutblock areas for WTPs. BCFS district staff have indicated that they are engaged in the landscape unit planning process and intend to implement WTP requirements consistent with the OSLRMP recommendations over the next couple of years.

Sensitivity analysis that examined the effect of decreasing existing and managed stand yields by 10 percent indicated that the initial harvest level of 2 615 000 cubic metres per year could be maintained for at least 7 decades before decreasing to mid-term harvest levels.

I have considered the information regarding stand-level biodiversity, and I have concluded that the assumptions applied in the OSLRMP revised analysis are consistent with provincial policy, which is intended to ensure adequate accounting for stand-level biodiversity. I note that the BCFS districts responsible for the management of the Okanagan TSA are in the process of completing the landscape unit planning process and that district policy regarding

volume retention for stand level biodiversity may exceed the modelled 3 percent by 1 to 2 percent for a few years. However, review of the sensitivity analyses provided indicates that the initial harvest level is relatively stable. Therefore, for this determination, I accept that stand-level biodiversity has been adequately accounted for in the OSLRMP-revised base case, and I will make no further adjustments in this regard.

I request that district staff continue to assess requirements for stand-level biodiversity in the TSA, such that biodiversity objectives can be clearly defined within the scope of the current policy framework.

- landscape-level biodiversity

Achieving landscape-level biodiversity objectives involves maintaining forests with a variety of patch sizes, seral stages, and forest stand attributes and structures, across a variety of ecosystems and landscapes. Managing for biodiversity is based in part on the principle that maintaining these conditions—together with connectivity of ecosystems and the maintenance of forested areas of sufficient size to maintain forest interior habitat conditions—will provide for the habitat needs of most forest and range organisms. A major consideration in managing for biodiversity at the landscape level is leaving sufficient and reasonably located patches of old-growth forests for species dependent on, or strongly associated with, old-growth forests. In accounting for landscape-level biodiversity in the analysis, the following modelling assumptions were made:

1) biodiversity emphasis options

The delineation and formal designation of "landscape units" is a key component of a sub-regional biodiversity management strategy. A landscape unit is an area established by the district manager, generally up to 100 000 hectares in size, based on topographic or geographic features such as a watershed, or series of watersheds, to manage biodiversity and other forest resource values.

The *Biodiversity Guidebook*, the *Landscape Unit Planning Guide* and *Higher Level Plans: Policy and Procedures* (Policies and Procedures) all provide policy and guidance on management for landscape-level biodiversity. The *Landscape Unit Planning Guide* contains forest cover requirements for old-seral forest that are to be applied at the biogeoclimatic subzone variant level within each landscape unit. The *Higher Level Plans: Policy and Procedures* provides further policy guidance. The *Policy and Procedures* outline three biodiversity emphasis options (BEOs) - lower, intermediate, and higher - that may be employed when establishing biodiversity management objectives for a landscape unit.

In the absence of legally established BEOs, to balance social and economic impacts against risk to biodiversity, the provincial policy generally followed for timber supply analyses—and in the analysis of the original base case for the Okanagan—is to model the distribution of BEOs using a weighted average forest cover requirement corresponding to a distribution by area of 45 percent in the lower, 45 percent in the intermediate, and 10 percent in the higher BEO for each landscape unit / biogeoclimatic subzone variant combination.

Current provincial policy direction from the *Landscape Unit Planning Guide* requires old seral requirements to be met immediately in higher and intermediate BEO areas. If it is not possible to immediately achieve old-growth targets in the higher and intermediate BEO areas, then Old Growth Management Areas (OGMAs) are designated in mature forested areas to recruit old growth forest. In lower biodiversity emphasis areas, one-third of old seral requirements must be met immediately with the full requirement being phased in over three rotations.

In the analysis for the original base case, it was assumed that one-third of the old seral stage requirement in the lower biodiversity emphasis areas had to be met immediately with the full requirement being phased in over three rotations ("one-third draw down").

Two sensitivity analyses were conducted that examined the effect of the base case assumptions for landscape-level biodiversity on timber supply. In the first sensitivity analysis, all the old seral stage requirements were removed. In the second sensitivity analysis, the "one-third draw down" was not permitted; therefore, all old seral requirements in the lower biodiversity emphasis areas had to be met immediately. The results of these analyses indicated that there was no impact on the short- or long-term timber supply; however, there was a small effect on the timing of the decline to the mid-term timber supply compared to the original base case.

Review of these analyses by BCFS staff indicated that there was a high degree of overlap between areas that were being reserved in the model to meet old seral stage requirements and areas already constrained due to visual quality and other objectives.

I have reviewed and discussed these results with BCFS staff and I conclude that the original base case assumptions regarding biodiversity emphasis options were modelled appropriately.

2) old-growth management areas

Use of the guidelines, as outlined in the *Landscape Unit Planning Guide*, would result in a total OGMA requirement on the timber harvesting land base of about 89 000 hectares throughout the entire forecast period, and would allow for the gradual recruitment of old seral stage requirements over three rotations in areas subject to lower BEOs. Provincial policy and the OSLRMP recommend that priority be given to the placement of OGMAs in stands on the non-timber harvesting land base prior to recruiting stands on the timber harvesting land base.

In the analysis for the OSLRMP-revised base case, it was assumed that there would be an immediate placement of OGMAs on the entire land base (i.e., no draw down of old seral requirements was permitted), of which 58 000 hectares would fall within the timber harvesting land base. Areas previously constrained for mule deer, visual quality objectives, and caribou, were considered to be available for placement of the 58 000 hectare OGMA requirement. MELP staff have indicated that the impact on the timber harvesting land base may be greater than assumed in the timber supply analysis if areas previously reserved for other resource management objectives are found to be unsuitable for OGMA placement.

Implementation of the OSLRMP will include an examination of the discrepancy between the amount of area required for OGMA placement that would result from implementation of the LUPG guidelines as opposed to the process recommended in the OSLRMP.

3) aging of forest stands in areas outside the timber harvesting land base

While the forest inventory supporting timber supply analyses is updated regularly to reflect recent disturbances such as those from fire, insects or disease, ongoing natural disturbances were not explicitly modelled in the original base case analysis. The SEAS, CES, and MELP have submitted it is unreasonable to assume in the analysis that forests outside the timber harvesting land base (non-contributing forests) will continue to age over time so that, eventually, all non-contributing stands are over 250 years old. As a result of this assumption, over time an unrealistic proportion of the old seral requirements for landscape-level biodiversity is projected to be met by non-contributing forests.

In the OSLRMP-revised base case, areas required for the placement of OGMAs were recruited from both the contributing and non-contributing land base at the beginning of the forecast period. These areas were then permanently reserved in the model from timber harvesting.

I have reviewed and discussed landscape-level biodiversity with BCFS and MELP staff. I have concluded that there is still a great deal of uncertainty regarding the actual approach that will be required for the placement of OGMAs in the Okanagan TSA. In the OSLRMP-revised base case, in which 58 000 hectares were immediately excluded from contributing to the timber harvesting land base at the beginning of the forecast period, the initial harvest level was maintained for 6 decades less and the long-term harvest level was approximately 9 percent lower than in the original base case. Therefore, for this determination, I note that there is a higher level of constraint represented by the OSLRMP-revised base case than was modelled in the original base case that is more likely to approximate the impact of landscape-level biodiversity requirements to timber supply in the Okanagan TSA.

In summary, I am mindful of the uncertainty regarding the eventual timber supply implications of implementing landscape-level biodiversity. Implementation of the OSLRMP and completion of the process outlined in the *Landscape Unit Planning Guide* in the Okanagan TSA will reduce this uncertainty. In view of the many decades of stable timber supply for this unit, as projected in both the original and OSLRMP-revised base case, I will account for any impact to timber supply arising from landscape-level biodiversity once this issue has been clarified. Therefore, I accept that the assumptions regarding landscape-level biodiversity incorporated in the OSLRMP-revised base case are adequate for use in this determination.

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber;

Okanagan-Shuswap Land and Resource Management Plan

Strategic plans establish the broader context for operational plans by providing objectives for managing forest resources in a given area. There are several types of planning processes that are described as strategic in relation to operational planning processes.

Distinction must be made between higher level plans as defined by the Forest Practices Code and strategic land use planning processes such as regional or subregional planning (land and resource management planning). Portions of plans arising from strategic planning processes may be declared as higher level plans under the Forest Practices Code. A higher level plan defined under the Forest Practices Code establishes government's social, economic, and environmental objectives, thereby setting the resource management context for developing subsequent operational plans.

The Okanagan-Shuswap Land and Resource Management Plan (OSLRMP) is a strategic land use plan for the Okanagan-Shuswap area, which includes the entire Okanagan TSA. The provincial government initiated the OSLRMP in July 1995. The OSLRMP Table reached full agreement on the OSLRMP on September 9, 2000 and the OSLRMP received Cabinet approval on January 17, 2001.

As part of the implementation process, an Okanagan-Shuswap Land and Resource Management Plan Implementation and Monitoring Committee (the monitoring committee) has been established to provide advice on activities relating to plan implementation and effectiveness monitoring on an ongoing basis. The monitoring committee has recommended that components of the OSLRMP be legally established under the Forest Practices Code as a higher level plan (HLP). At the time of this determination, drafting of a HLP order has not been completed.

The OSLRMP has also proposed an increase in protected areas (see *protected areas*). To date, the Goal 1 protected areas have been established through an order-in-council.

I am aware that current practice in the Okanagan TSA is guided by the recommendations arising from the OSLRMP, and that these recommendations were used in the development of the assumptions for the OSLRMP-revised base case. I believe that the period following the approval of the OSLRMP by government will provide greater clarity around the management for specific resource values in the Okanagan TSA. If, during the implementation of the OSLRMP, management considerations for specific values become less or more constraining than those which guided current practice as described in this timber supply review, then this can be factored into a future determination.

- First Nations considerations

Members of eleven First Nations reside in or have asserted traditional territories within the Okanagan TSA. Seven Okanagan bands (Lower Similkameen, Upper Similkameen, Osoyoos, Penticton, Westbank, Okanagan, and Upper Nicola) are affiliated with the Okanagan Nation Alliance and two Shuswap bands (Adams Lake and Nekonlith) belong to the Shuswap Nation Tribal Council. The Little Shuswap and Spallumacheen bands are independent, but are considered part of the Shuswap Nation Community. The Upper Nicola Band is considered part of the Okanagan Nation Alliance as well as the Nicola Tribal Association.

In general, First Nations in the Okanagan TSA have expressed an interest in being involved in a full range of forestry activities including silviculture, harvesting, watershed restoration, and technical work. The Adams Lake, Neskonlith, Little Shuswap, Spallumacheen,

Westbank, and Osoyoos bands have woodlots near the Okanagan TSA. The Upper Similkameen band has a woodlot near the adjacent Merritt TSA. These bands, as well as the Okanagan band, have also been involved with the Small Business Forest Enterprise Program (SBFEP). At present the only First Nation involved in the treaty process is the Westbank First Nation.

First Nations maintain they have the rights to resources within their asserted traditional territory. Bands within the Okanagan TSA have indicated that they want access to forest resources.

The Neskonlith and Adams Lake First Nations communities indicate that the area encompassing Kela7scen (Mount Ida) is highly significant to their culture. A local working group has been formed and it is trying to address First Nations' concerns and future forestry development within the area. In the Salmon Arm Forest District, local First Nations have indicated that they do not support any further timber harvesting within the area unless there are forest health concerns that must be addressed. Consequently, a licensee with approved cutting permits has delayed commencement of any harvesting within the Mt. Ida area.

BCFS district staff have estimated that approximately 250 hectares are currently being deferred from harvesting due to First Nations concerns in the Okanagan TSA. Review of the analysis that examined the sensitivity of the harvest levels projected in the OSLRMP-revised base case timber supply to a 5 percent decrease in the size of the timber harvesting land base indicates that a land base exclusion of the magnitude being discussed here has no effect on timber supply for at least 6 decades.

BCFS district staff indicate that they have received submissions from the Upper Nicola Band indicating that the areas surrounding Pennask Mountain and Tahaetkun Mountain are significant to their community and that they would like to see these areas protected.

I am concerned that the continued deferral of harvesting in stands on portions of the timber harvesting land base may lead to concentration of harvesting upon the rest of the timber harvesting land base. However, for this determination, I note that the current deferral area is small and the timber supply projected in the OSLRMP revised base case is not sensitive to changes of this magnitude in the size of the timber harvesting land base, therefore I am satisfied that these matters do not introduce unacceptable risk to the analysis.

First Nations have expressed concern that the current consultation and referral processes are inadequate and that there is a lack of capacity to deal with referrals. According to BCFS staff, addressing these concerns often leads to delays in the approval process or the avoidance of areas during harvesting. However, they also note that the government is developing a consultation process with the Okanagan Nations Alliance primarily focusing on the referral process.

Finally, with respect to ongoing land claims and the provincial treaty process I have noted under my 'Guiding Principles', it is inappropriate for me to attempt to speculate on the impacts on timber supply that will result from decisions that have not yet been taken by government. As future decisions on treaty negotiations are implemented by government, they will be reflected in future timber supply analyses for the TSA.

Harvest sequencing and profile

In the analysis, it was assumed that harvest priority is placed on those stands which have aged furthest beyond their minimum harvestable age. For the purposes of modelling, this is expressed through the use of a *relative oldest first* harvest rule.

BCFS district staff note that there are numerous determinants of which stands are available for harvesting and this tends to constrain the option of harvesting stands that are relatively the oldest in comparison to their minimum harvestable age. They believe that this results in a slightly more random approach to harvesting.

Sensitivity analysis that evaluated the impact of applying random or absolute oldest first harvest rules had no effect on the short-term timber supply. Use of the random harvest rule was found to decrease the mid-term timber supply slightly; however, the same long-term harvest level was achieved after 20 decades.

This indicates that short-term timber supply is not affected and that the initial harvest level can be maintained regardless of uncertainties in this factor. Furthermore, I note that the timber supply analysis incorporates many of the same constraints that influence the operational availability of stands for harvesting, hence concerns regarding harvest sequencing are already being addressed. Therefore, until more detailed information suggests otherwise, I will accept that the harvesting priority assumed in the timber supply analysis represents the best available information and is adequate for use in this determination.

In the rationale for the 1996 AAC determination, I noted that "harvesting activities within 10 years will have to resemble more closely the harvest profile projected in the timber supply analysis, (particularly with regard to harvesting in areas considered to be part of the Interior Douglas-fir biogeoclimatic zone)". To this end, I instructed BCFS district staff to monitor the "performance in harvesting in all areas and tree species that comprise the timber harvesting land base".

MELP staff expressed concern that the current level of performance in the Interior Douglas-fir biogeoclimatic zone (referred to as *dry-belt fir*), which is located primarily within the Penticton Forest District, is too low relative to the contribution of these stands to the timber harvesting land base. They note that dry-belt fir stands, in which selection harvesting is practiced, provide high biodiversity value and habitat for numerous species, including ungulates. Historically these stands classified as natural disturbance type 4 (NDT4) have been subject to frequent low intensity fires and disturbance is key to maintaining the biological integrity of these stands. MELP staff have requested that harvesting within the dry-belt fir stands be increased to levels that are proportional to their contribution to the timber harvesting land base in order to maintain disturbance levels thereby helping to manage for non-timber resources. I am aware that the Kamloops Forest Region has established a committee to specifically examine the issues related to this stand type and provide management recommendations.

BCFS district and MELP staff have conducted a review of recent harvesting activities in the Okanagan TSA that indicates that about 0.2 percent of dry-belt fir stands in areas classified as ungulate winter range have been harvested. BCFS district staff have indicated that in

previous years harvesting within the Penticton Forest District has been focused on lodgepole pine stands in order to reduce the incidence of mountain-pine beetle infestations. However, they submit that increased harvesting to better reflect the actual contribution of the Douglas-fir timber types to the timber harvesting land base is proposed and a review of approved Forest Development Plans (FDPs) confirms that the percentage of dry-belt fir stands planned for harvest has recently increased to about 5 percent.

BCFS district staff conducted a review of stands within biogeoclimatic zones in the TSA in order to determine potential sites for the placement of OGMAs. Their review indicated that there was an apparent shortage of sites in areas of dry-belt fir that were suitable for OGMA placement and requested that licensees avoid harvesting in these stands until landscape unit planning was complete. Once OGMA placement is complete, the level of selection harvesting within dry-belt fir stands is expected to increase.

In summary, I concur with MELP staff that these stands would benefit from continuing low-level disturbance as is provided by selection harvesting. I note that the historical performance in dry-belt fir stands is significantly less than their proportional contribution to the timber harvesting land base; however, BCFS district staff have indicated that an increase in performance in these stands is planned once the issue of OGMA placement within these stands has been completed.

For this determination, I note that the volume contribution from dry-belt fir stands is relatively low and therefore it is unlikely that any discrepancies between the harvest profile assumed in the analysis and current performance levels will impact timber supply. Therefore, I am satisfied that the assumptions made in the analysis are generally adequate for use in this determination. However, I continue to be concerned that the level of performance in the dry-belt fir stands is not sufficient to maintain the biological integrity of these stands and encourage BCFS district staff to complete the placement of OGMAs. Once OGMA placement in these stands has been completed, I request that BCFS staff monitor performance in the dry-belt fir stand types on the Okanagan TSA. If at the next determination performance in these stand types continues to be disproportionate to their contribution to the timber harvesting land base I will consider the appropriateness of their inclusion in the timber harvesting land base.

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

Alternative rates of harvest

The nature of the transition from harvesting old-growth to second-growth forests is a major consideration in determining AACs in many parts of the province. In the short term, the large timber volumes in older forests often permit harvesting above long-term levels without jeopardizing future timber supplies. In keeping with the objectives of good forest stewardship, AACs in British Columbia have been and continue to be determined to ensure that current and mid-term harvest levels will be compatible with a smooth transition toward the usually (but not always) lower long-term harvest level. Thus, timber supply should remain stable enough so that there will be no inordinately adverse impacts on current or future generations. To achieve this, the AAC determined must not be so high as to cause

later disruptive shortfalls in supply nor so low as to cause immediate social and economic impacts beyond that required to maintain forest productivity and future harvest stability.

In the analysis for the Okanagan TSA, one alternative rate of harvest was evaluated in addition to the original and OSLRMP-revised base cases. In the alternative harvest flow option, the initial harvest level of 3 725 000 cubic metres per year could be maintained for two decades before decreasing by about 10 percent per decade for 5 decades before reaching the long-term harvest level of 2 076 000 cubic metres per year.

As discussed under Base Case for the Okanagan TSA, I have reviewed the alternative harvest forecast provided, and am satisfied that the harvest flow selected as the OSLRMP-revised base case provides the most suitable forecast of timber supply of the forecasts prepared, and provides a suitable basis from which to evaluate the assumptions applied in the analysis.

Community dependence on the forest industry

The socio-economic analysis for the Okanagan TSA details the impact of timber supply adjustments on local communities and the provincial economy. The three most significant contributors to the economy of the Okanagan TSA are the public sector (including government-employed forestry workers), construction, and tourism. In 1996, the forestry sector supported approximately 11 percent of the total labour force in the TSA. The Salvage Loggers' Association (SLA) noted that forestry related employment in the Lumby-Cherryville area is higher than in other parts of the TSA.

The analysis reports that the current AAC of 2.615 million cubic metres can support 2930 person-years of direct forestry employment and 1935 person-years of indirect/induced employment within the TSA. Provincially, including local employment, the current AAC can support at least 3276 person-years of direct forestry employment and 3978 person-years of indirect and induced employment. Annual provincial revenues associated with this AAC, including provincial income tax, royalties, stumpage and rent, total about 103.2 million dollars.

In 1999, Weyerhaeuser closed their mill in Lumby, thereby eliminating 150 positions at that site. In 2000, Riverside Forest Products Ltd. curtailed their operations at the Lavington mill site, reducing staff from 136 to 10 employees. Public input received from the Shuswap Environmental Action Society (SEAS) and the Canadian EarthCare Society (CES) noted that local employment and income levels do not seem to be directly tied to AAC levels as the socio-economic analysis suggests as these mills have closed in spite of a constant AAC.

The SEAS, CES, and Little Shuswap Indian Band (LSIB) also commented that the importance of the forest economy appears to be steadily declining in the Okanagan TSA as population within the area continues to increase. They also cited studies conducted in the United States that indicate that local economies benefit more from forest protection than from forest development. I note that these groups believe that the Okanagan TSA would benefit more from other sectors than forestry. However, many of the issues raised by these groups are beyond my jurisdiction, as described in section 8 of the *Forest Act*. While I acknowledge that other sectors provide more total employment than the forestry sector, I

note that this does not reduce the contribution to employment and community stability provided by the forestry sector.

I note that the Timber Supply Review strives to adequately reflect the protection measures for all resource values, including visual quality, wildlife habitat, recreation and other values on which tourism is partly dependent. I am satisfied that an appropriate accounting for these resource values has been made in this determination, either in the timber supply analysis assumptions, or as a result of the adjustments I am making to in this determination. I have reviewed the socio-economic analysis, which used an established and sound methodology to evaluate the community dependencies for the Okanagan TSA. I am mindful that communities within and outside of the Okanagan TSA depend on the timber supply from the TSA, and that any adjustment to the harvest level will impact these communities.

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities;

Timber processing facilities

- existing mills

Timber processing facilities within the TSA include: lumber mills, several pole plants, and several plywood plants. In 1998, the TSA's wood processing facilities required 4.5 million cubic metres, of which approximately 60 percent was harvested from the TSA. The mills in the TSA also process harvested timber from other TSAs, TFLs or private sources.

I have reviewed the information regarding timber processing facilities and conclude that there is a high level of demand from within and outside the TSA for the timber harvested.

- proposed facilities

I am not aware of any new facilities currently planned for the Okanagan TSA.

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia,

Economic and social objectives

- Minister's letter and memorandum

The Minister of Forests has expressed the economic and social objectives of the Crown for the province in two documents to the chief forester: a letter dated July 28, 1994, (attached as Appendix 3) and a memorandum dated February 26, 1996 (attached as Appendix 4). The letter and memorandum include objectives for forest stewardship, a stable timber supply, and allowance of time for communities to adjust to harvest-level changes in a managed transition from old-growth to second-growth forests, so as to provide for community stability.

The Minister stated in his letter of July 28, 1994, that "any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability."

He emphasized the importance of long-term community stability and the continued availability of good forest jobs. To this end he asked that the chief forester consider the potential impacts on timber supply of commercial thinning and harvesting in previously uneconomical areas. To encourage this the Minister suggested consideration of partitioned AACs.

I have considered the contents of the letter and memorandum in my determination of an AAC for the Okanagan TSA. As discussed under *commercial thinning*, I have concluded there are limited opportunities for commercial thinning at this time. However, opportunities may increase and I will consider this in future determinations. As discussed under Abnormal infestations and salvage, I believe additional volume to that assumed in the analysis is available for harvesting and therefore an increase to the harvest level is warranted at this time.

- *local objectives*

The Minister's letter of July 28, 1994, suggests that the chief forester should consider important social and economic objectives that may be derived from the public input in the Timber Supply Review where these are consistent with government's broader objectives. Many public responses were received regarding the information report and data package, and the timber supply and socio-economic analyses. The summary of public input is reproduced as attached in Appendix 5.

The approval of the Okanagan-Shuswap Land and Resource Management Plan (OSLRMP) reflects the government's commitment to achieve the Crown's social and economic objectives for the region, including the Okanagan TSA. Furthermore, ongoing activities associated with creating a higher level plan (HLP), which flows from the OSLRMP, is further evidence of government's objectives for this area. Overall, the HLP is expected to give greater certainty for both environmental values and the forest industry.

As discussed elsewhere in this document, the analysis accounts for management under the Forest Practices Code and includes many aspects of the OSLRMP. Where necessary, I have accounted for adjustments in my determination in order to more accurately reflect the implications of current management in this TSA. In my considerations throughout this document I have attempted to account for the need to balance socio-economic and environmental benefits and risks both now and over time.

I am mindful of the public input received and, where possible in this rationale, I have attempted to respond briefly to specific concerns. I note that some of the public input received refers to items beyond my mandate for consideration under the *Forest Act*, which relates specifically to the determination of AACs for TSAs and TFLs. Nevertheless, consideration of public input has been an important component of my determination for the Okanagan TSA.

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

Abnormal infestations and salvage

Forest stands are susceptible to damaging agents such as wildfires, windthrow, disease, and insects. Timber volume losses due to insects and diseases that normally affect stands (endemic losses) are generally measured and accounted for during forest inventory sampling for existing stand volumes or through other sampling methods. However, I believe there are exceptions to this, which I will discuss later in this section. Losses associated with second-growth stands are addressed by application of operational adjustment factors (OAFs) as noted under *volume estimates for regenerating stands*. In the timber supply analysis it is necessary to estimate and account for the unsalvaged losses resulting from epidemic (abnormal) infestations on the timber harvesting land base that are not incorporated into volume estimates.

BCFS district forest health and Protection Branch staff estimates for annual non-recoverable losses (NRLs) that were used in the 2000 timber supply analysis were: 25 425 cubic metres per year due to insects, 9560 cubic metres per year due to windthrow, and 39 525 cubic metres per year due to fire, for a total 74 510 cubic metres per year. In the timber supply analysis, NRLs were assumed not to contribute to timber supply; therefore, all forecasts, in this analysis were net of the 74 510 cubic metres per year estimated to be lost.

The three BCFS districts responsible for administering the Okanagan TSA have been operating a small-scale salvage program (SSSP) since the late 1970's. At present, over 120 registered salvage loggers are engaged in searching the forests for small volumes of dead or dying trees that the larger licence-holders do not usually harvest. BCFS district staff indicate that most of the trees being salvaged have either been damaged by insect infestation or by windthrow. The majority of the salvaged timber is being harvested by single-tree selection and is authorized under timber sales that are less than 500 cubic metres per licence.

BCFS district staff indicate that the relatively mild climate and extensive stands of susceptible pine, Douglas-fir, and spruce result in a high incidence of insect infestation. In combination with patches of windthrown trees, good road access, and easily operable terrain, these factors result in a large number of salvage opportunities. BCFS district staff estimate that the SSSP is currently recovering a total volume of 98 770 cubic metres per year, of which 59 262 cubic metres per year (about 60 percent) is considered to be harvested as part of the AAC, for cut control purposes (i.e., it is "on-quota" wood).

District staff believe that the "on quota" salvaged wood would quickly deteriorate to "off quota" grade (of little or no economic value) and increase the risk of spread of insect infestations if much of it were not promptly recovered. Vernon Forest District staff estimate that opportunities exist for an additional 10 000 to 20 000 cubic metres per year of salvage; however, a lack of administrative resources has precluded expansion of the program to date. Notwithstanding the administrative challenges to delivering a program of

about 80 000 cubic metres per year, staff have also noted that the program size is also currently limited by the AAC.

In the analysis for the previous timber supply review, estimated NRLs were: 99 480 cubic metres per year due to insects, 22 000 cubic metres per year due to windthrow, 3 430 cubic metres per year due to fire, and 1 700 cubic metres per year due to unspecified causes, for a total of 126 610 cubic metres per year. The total difference in NRLs between the 1996 and 2000 timber supply analyses is 52 100 cubic metres per year. After deducting the NRL volume attributable to fire, the difference in NRL volume attributable to insects and windthrow represents a reduction of 86 495 cubic metres per year in the current estimates as compared to the previous estimates. Arguably, some of this reduction is attributable to the small-scale salvage program although it is difficult to correlate the amount with certainty due to lack of data resolution in yield curves as discussed later in this section. Subsequent to the release of the timber supply analysis report, two sensitivity analyses were prepared to examine the effect on timber supply of not recovering the 52 000 cubic metres per year of "on-quota" wood, which was damaged by insects, windthrow, and fire, recovered by the SSSP. In the first analysis, the decline to the long-term harvest level occurred two decades earlier than in the original base case. In the second analysis, the decline to a long-term harvest level 26 000 cubic metres per year lower than in the OSLRMP-revised base case was reached one decade earlier.

Public input received from the United Salvage Loggers Association (USLA) requested that a specific partition be set for harvesting under the SSSP to acknowledge its role in increasing timber supply in the TSA". The Regional District of the North Okanagan voiced support for the "forestry salvage program" and felt that additional harvesting was justified to bolster the local economy and reduce losses in older forests. The CES and SEAS noted that losses in the Okanagan TSA appeared to be lower "despite the increase in fires and beetles in this TSA". The LSIB indicated that "significant reduction in losses cannot adequately reflect the actual situation in the environment". While I acknowledge that the small-scale salvage program helps to increase timber supply by capturing the losses estimated to occur; I also recognize that the program also plays a role in simply maintaining harvest projections by recovering losses beyond those currently estimated.

MELP staff noted that dead and dying trees contribute to a variety of ecological processes and are concerned that the SSSP may impact on these processes if insufficient coarse woody debris remained in stands to support these processes. No coarse woody debris data specific to the SSSP was available and development of recommendations regarding coarse woody debris retention from the OSLRMP was focused on larger harvesting operations. CWD management is a provincial issue, and monitoring is ongoing to examine the trade-offs between full utilization and CWD. Pending completion of these studies and any potential revision of policies and practices regarding CWD, I accept that the assumptions used in the analysis reflect current practices. Nevertheless, I will leave it to operational staff and their site-specific considerations to determine appropriate practices for protecting ecological processes.

I commend BCFS staff on an innovative and effective SSSP that is providing significant local employment, reducing the spread of insect infestations, and salvaging wood that would otherwise become unusable. I also acknowledge MELP's concerns regarding the

importance of dead and decaying trees to ecosystems, but at this time, I am deferring to ongoing reviews and assessments that are being conducted in the province as being the appropriate actions which will lead to policy clarification of this matter. I also encourage BCFS and MELP staff to continue reviewing this matter at the field level with a view to establishing appropriate interim operating procedures. Finally, I observe that the relatively small volume involved does not preclude retaining more volume at the time of stand level harvest.

In reviewing the NRLs used in the analysis and having considered the ongoing and proposed small-scale salvage program, I observe that their relationship to the timber supply forecast is complex and difficult to verify. However, having reviewed the assumptions for both the 1996 timber supply analysis and the current timber supply analysis, I have drawn the conclusion that the small-scale salvage program does in fact contribute to an overall reduction in losses for the Okanagan TSA, thereby improving the overall timber supply projection for the TSA.

I also note that the NRLs are projected across the entire planning horizon in the analysis. Given that future regenerated stands are projected using TIPSY and that an operational adjustment factor is applied to those stands to account for future stand losses, it is likely that also reducing the harvest levels to account for NRLs in the long term is overly restrictive. Therefore, I conclude that that long-term timber supply will be higher than projected in the base case.

Finally, there is an outstanding matter that requires consideration. There is uncertainty over how individual trees or small groups of trees that are subject to mortality such as through windthrow or beetle attack are reflected in the development of yield projection models (see *volume estimates for existing stands* and *volume estimates for regenerating stands*).

Operational adjustment factors are applied to managed stand yield tables in an attempt to reflect these foreseeable losses in regenerating stands. Additionally, field sampling techniques and the data supporting the development of natural stand yield projections will also account for some of these losses in existing stands. There are therefore numerous attempts in data and modelling to account for such losses. However, the ability of data and modelling to project and track individual trees is fraught with uncertainty. Therefore, I question whether or not the salvage of these trees part way through the rotation of a given stand results in the harvesting of volume that forms part of the timber supply projection or results in the recovery of volume that is in addition to that projected in the timber supply analysis.

I have consulted extensively with BCFS district and headquarters staff on this matter and have concluded that while there is uncertainty, it is also likely that some of the volume recovered through the small-scale salvage program is volume in addition to that projected in the timber supply analysis. Given the data uncertainties, it would introduce spurious precision into the decision if I were to try and quantify this amount of additional volume with certainty. However, I have concluded that the activities of the small-scale salvage program do serve to maintain and augment timber supply beyond that projected in the base case. I will discuss this further under "Reasons for decision".

Reasons for decision

In reaching my AAC determination for the Okanagan TSA, I have considered all of the factors presented above and have reasoned as follows.

In the OSLRMP-revised base case, the initial harvest level of 2 615 000 cubic metres per year could be maintained for 8 decades. This was followed in the next decade by a 10-percent decline to 2 354 000 cubic metres per year for 1 decade, before decreasing to the steady long-term harvest level of 2 076 000 cubic metres per year. In determining this AAC, I have identified many factors that indicate that the timber supply may be more or may be less than the level projected in the OSLRMP-revised base case. Generally some of these factors may influence timber supply by adding an element of risk or uncertainty to the decision but cannot be reliably quantified at the time of this determination.

For this determination, there is one factor that has been identified that indicates that the timber supply in the OSLRMP revised base case has probably been overestimated by a quantifiable amount, as follows:

- *Identified Wildlife Management Strategy* – to allow for the implementation of the Identified Wildlife Management Strategy, I am accounting for an overestimation of up to one percent in the timber supply throughout the forecast period.

For this determination, there is also one factor that has been identified that indicates that the timber supply in the OSLRMP-revised base case has probably been overestimated by an unquantifiable amount, as follows:

- *ungulate winter range* – implementation of mule deer winter range forest cover requirements at a planning cell level rather than on a LU/BEC basis results in an unquantified downward pressure on the mid- to long-tern timber supply.

For this determination, there are two factors that have been identified that indicate that the timber supply in the OSLRMP-revised base case has probably been underestimated by a quantifiable amount, as follows:

- *woodlot licences*- the area reduction associated with the issuance of woodlot licences assumed in the analysis was over-estimated by 1257 hectares. This represents a 0.1 percent underestimation in the size of the timber harvesting land base and results in a relatively minor underestimation in timber supply across the forecast period.
- *volume estimates for regenerating stands* -the use of class A lodgepole pine and spruce seed represents in aggregate a 5.5 percent increase in the productivity of regenerating stands on the TSA. This results in an increase in the long-term timber supply, and to a lesser extent an increase in the mid-term timber supply.

For this determination, there are two factors that have been identified that indicate that the timber supply in the OSLRMP-revised base case has probably been underestimated by an unquantifiable amount, as follows:

- *site productivity* – the timber supply analysis for the Okanagan TSA was based on overly conservative estimates of site productivity. This results in an unquantified upward pressure that will affect the mid- to long-term timber supply.
- *Small-scale salvage program*—the small-scale salvage program in part works to reduce unsalvaged losses in the TSA and also captures volume from unaccounted for mortality, thereby resulting in an upward pressure that affects timber supply across the forecast period.

In accordance with the *Forest Act*, the volume and area associated with woodlot licences issued since the previous AAC determination do not contribute to the timber supply supporting this decision.

I have considered the remaining factors listed above and have evaluated them on the basis of which portion of the forecast period they affect (the short, mid, or long term).

Some factors that affect the short- to long-term include: the establishment of WHAs in accordance with the IWMS; the exclusion of too large an area to account for woodlot licences issued since the last determination; and the implementation of forest cover requirements for mule deer winter range at the planning cell level. Recognizing the small upward pressure from woodlots is likely offset by the downward pressures of the IWMS and the winter ranges, I have concluded that in aggregate these factors represent a small net downward pressure on timber supply and act primarily to restrict the size of the timber harvesting land base.

Sensitivity analysis that examined the effect of decreasing the size of the timber harvesting land base assumed in the OSLRMP-revised base case indicated that a 5 percent decrease in the size of the timber harvesting land base resulted in a decline in the initial harvest level of 2 615 000 cubic metres per year after 6 decades rather than after 8 decades. The long term harvest level decreased from 2 076 000 cubic metres per year by about 3 percent to 2 005 000 cubic metres per year. My evaluation causes me to conclude that the net downward pressure on timber supply from the above three factors is clearly less restrictive than the five percent sensitivity analysis and therefore it is reasonable to conclude that short term timber supply will not be affected by them. Furthermore, mid- to long-term timber supply will be only moderately affected on account of these factors (at an amount that is less than indicated in the sensitivity analysis).

In addition to the factors listed above, other factors that affect only the long-term timber supply include: the underestimation of regenerating stand yields to account for genetic gain and underestimation of site productivity. With respect to genetic gain, I have concluded that mid- to long-term timber supply has been underestimated by 5.5 percent. Previously, I referred to the land base sensitivity analysis and concluded that the downward pressures would result in a lesser impact than it showed. If I now weigh into that conclusion the long term influence of genetic gains, I further conclude that the timber supply projection is now improved to a level that approximates or is even more favorable than shown in the OSLRMP-revised base case.

The impact to timber supply that results from an underestimation of site productivity, as evidenced by a substantial body of provincial research, is difficult to quantify specifically

for this TSA at this time due to the lack of localized studies of site productivity. However, I expect that the mid- to long- term timber supply is higher than indicated in the OSLRMP-revised base case. I am viewing this factor as primarily affecting mid- to long-term timber supply at this time. Until such time as there is more certainty on the magnitude of possible site productivity changes, I am not willing place any weight on the possibility of a short-term impact on timber supply. In any event, when further information becomes available it can be factored into subsequent determinations.

Having noted and considered the interaction of all of the above factors and the uncertainty in some of the factors, I have concluded that the timber supply is likely more stable than shown in the OSLRMP-revised base case.

This brings me to the outstanding matter of the small-scale salvage program. Earlier in this document, I concluded that the program provides many benefits within the TSA ranging from social and economic returns through to improvements in forest health, reduced risk of future loss, and maintenance and augmentation of timber supply. I have acknowledged the complexity of the interactions between the unsalvaged loss estimates, the small-scale salvage program and the accounting for mortality within yield models. Although there is uncertainty, it is clear to me that timber supply is underestimated across the entire forecast on account of this factor because of the small-scale salvage program.

In consideration of the many social, economic, and forest health benefits associated with the small scale-salvage program, I am placing weight on the likely increase in timber supply associated with this action. I am prepared to recognize the benefits of the proposed 80 000 cubic metre program outlined by BCFS district staff and am establishing a partition to accommodate the small-scale salvage program within the AAC. It is important to note that the OSLRMP-revised base case excluded the area and volume assigned to woodlots issued since the time of the last AAC decision, yet still projected maintenance of the historic AAC. Therefore, if I increase the AAC by 40 000 cubic metres, the full 80 000 cubic metre program can be accommodated within the newly established partition within the AAC.

Determination

I have considered and reviewed all the factors as documented above, including the risks and uncertainties of the information provided. It is my determination that a timber harvest level that accommodates objectives for all forest resources during the next five years, that reflects current management practices as well as the socio-economic objectives of the Crown, can be best achieved on the Okanagan TSA by establishing an AAC of 2 655 000 cubic metres (which includes a partition of 80 000 cubic metres per year for small-scale salvage).

This determination is effective August 1, 2001, and will remain in effect until a new AAC is determined, which must take place within five years of the date of this determination.

If additional significant new information is made available to me, or major changes occur in the management assumptions upon which I have predicated this decision, then I am prepared to revisit this determination sooner than the five years required by legislation.

Partition definitions

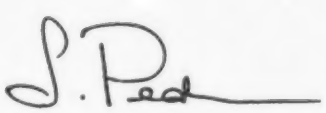
Small-scale salvage program:

The partition is with respect to dead trees or trees that will not survive as a result of windthrow and/or insect attack,with recognition of the need for access to necessary amounts of live and merchantable trees required for safety, to a maximum volume of 500 cubic metres if salvage is concentrated; or 50 cubic metres per hectare if salvage is scattered. It is reasonable to expect that some level of flexibility will be required in implementing this partition and I leave its further administration to the discretion of the district managers and/or the regional manager.

Implementation

In the period following this decision and leading to the subsequent determination, I encourage BCFS staff to undertake the tasks and studies noted below that I have also mentioned in the appropriate sections of this rationale document. I recognize that the ability of staff to undertake these projects is dependent on available staff resource time and funding. These projects are, however, important to help reduce the risk and uncertainty associated with key factors that affect the timber supply in the Okanagan TSA. I recommend that district staff:

- pursue funding for a new forest inventory for the TSA;
- work with licensee staff to collect improved site productivity data for the stands in the TSA;
- work with MELP staff to establish WHAs;
- work with licensee staff to ensure operational management requirements for stand level biodiversity are clarified so as to be consistent with the OSLRMP and higher level plan objectives;
- monitor harvesting performance in the dry belt Douglas-fir selection logging zone; and
- work with MELP staff to establish interim operating procedures for the management of coarse woody debris in relation to the small-scale salvage program.



Larry Pedersen
Chief Forester
July 19, 2001

Appendix 1: Section 8 of the *Forest Act*

Section 8 of the *Forest Act*, Revised Statutes of British Columbia 1996, reads as follows:

Allowable annual cut

8. (1) The chief forester must determine an allowable annual cut at least once every 5 years after the date of the last determination, for

(a) the Crown land in each timber supply area, excluding tree farm licence areas, community forest areas and woodlot licence areas, and

(b) each tree farm licence area.

(2) If the minister

(a) makes an order under section 7 (b) respecting a timber supply area, or

(b) amends or enters into a tree farm licence to accomplish the result set out under section 39 (1) (a) to (d),

the chief forester must make an allowable annual cut determination under subsection (1) for the timber supply area or tree farm licence area

(c) within 5 years after the order under paragraph (a) or the amendment or entering into under paragraph (b), and

(d) after the determination under paragraph (c), at least once every 5 years after the date of the last determination.

(3) If

(a) the allowable annual cut for the tree farm licence area is reduced under section 9 (3), and

(b) the chief forester subsequently determines, under subsection (1) of this section, the allowable annual cut for the tree farm licence area,

the chief forester must determine an allowable annual cut at least once every 5 years from the date the allowable annual cut under subsection (1) of this section is effective under section 9 (6).

(4) If the allowable annual cut for the tree farm licence area is reduced under section 9 (3), the chief forester is not required to make the determination under subsection (1) of this section at the times set out in subsection (1) or (2) (c) or (d), but must make that determination within one year after the chief forester determines that the holder is in compliance with section 9 (2).

(5) In determining an allowable annual cut under subsection (1) the chief forester may specify portions of the allowable annual cut attributable to

(a) different types of timber and terrain in different parts of Crown land within a timber supply area or tree farm licence area, and

(b) different types of timber and terrain in different parts of private land within a tree farm licence area.

(c) [Repealed 1999-10-1.]

(6) The regional manager or district manager must determine an allowable annual cut for each woodlot licence area, according to the licence.

(7) The regional manager or the regional manager's designate must determine a rate of timber harvesting for each community forest agreement area, in accordance with

(a) the community forest agreement, and

(b) any directions of the chief forester.

(8) In determining an allowable annual cut under subsection (1) the chief forester, despite anything to the contrary in an agreement listed in section 12, must consider

(a) the rate of timber production that may be sustained on the area, taking into account

(i) the composition of the forest and its expected rate of growth on the area,

(ii) the expected time that it will take the forest to become re-established on the area following denudation,

(iii) silvicultural treatments to be applied to the area,

(iv) the standard of timber utilization and the allowance for decay, waste and breakage expected to be applied with respect to timber harvesting on the area,

(v) the constraints on the amount of timber produced from the area that reasonably can be expected by use of the area for purposes other than timber production, and

(vi) any other information that, in the chief forester's opinion, relates to the capability of the area to produce timber,

(b) the short and long term implications to British Columbia of alternative rates of timber harvesting from the area,

(c) the nature, production capabilities and timber requirements of established and proposed timber processing facilities,

(d) the economic and social objectives of the government, as expressed by the minister, for the area, for the general region and for British Columbia, and

(e) abnormal infestations in and devastations of, and major salvage programs planned for, timber on the area.

- - - - - -

Appendix 2: Section 4 of the *Ministry of Forests Act*

Section 4 of the *Ministry of Forests Act* (consolidated 1988) reads as follows:

Purposes and functions of ministry

4. The purposes and functions of the ministry are, under the direction of the minister, to

(a) encourage maximum productivity of the forest and range resources in British Columbia;

(b) manage, protect and conserve the forest and range resources of the government, having regard to the immediate and long term economic and social benefits they may confer on British Columbia;

(c) plan the use of the forest and range resources of the government, so that the production of timber and forage, the harvesting of timber, the grazing of livestock and the realization of fisheries, wildlife, water, outdoor recreation and other natural resource values are coordinated and integrated, in consultation and cooperation with other ministries and agencies of the government and with the private sector;

(d) encourage a vigorous, efficient and world competitive timber processing industry in British Columbia; and

(e) assert the financial interest of the government in its forest and range resources in a systematic and equitable manner.

Documents attached:

Appendix 3: Minister of Forests' letter of July 28, 1994

Appendix 4: Minister of Forests' memo of February 26, 1996

Appendix 5: Summary of Public Input

File: 10100-01

JUL 28 1994

John Cuthbert
Chief Forester
Ministry of Forests
595 Pandora Avenue
Victoria, British Columbia
V8W 3E7

Dear John Cuthbert:

Re: Economic and Social Objectives of the Crown

The *Forest Act* gives you the clear responsibility for determining Allowable Annual Cuts, decisions with far-reaching implications for the province's economy. The *Forest Act* provides that you consider the social and economic objectives of the Crown, as expressed by me, in making these determinations. The purpose of this letter is to provide this information to you.

The social and economic objectives expressed below should be considered in conjunction with environmental considerations as reflected in the Forest Practices Code, which requires recognition and better protection of non-timber values such as biodiversity, wildlife and water quality.

The government's general social and economic objectives for the forest sector are made clear in the goals of the Forest Renewal Program. In relation to the Allowable Annual Cut determinations you must make, I would emphasize the particular importance the government attaches to the continued availability of good forest jobs and to the long-term stability of communities that rely on forests.

Through the Forest Renewal Plan, the government is taking the steps necessary to facilitate the transition to more value-based management in the forest and the forest sector. We feel that adjustment costs should be minimized wherever possible, and to this end, any decreases in allowable cut at this time should be no larger than are necessary to avoid compromising long-run sustainability.

.../2

Province of
British Columbia

Minister of
Forests

Parliament Buildings
Victoria, British Columbia
V8V 1X4

In addition to the provincial perspective, you should also consider important local social and economic objectives that may be derived from the public input on the Timber Supply Review discussion papers where these are consistent with the government's broader objectives.

Finally, I would note that improving economic conditions may make it possible to harvest timber which has typically not been used in the past. For example, use of wood from commercial thinnings and previously uneconomic areas may assist in maintaining harvests without violating forest practices constraints. I urge you to consider all available vehicles, such as partitioned cuts, which could provide the forest industry with the opportunity and incentive to demonstrate their ability to utilize such timber resources.

Yours truly,

Andrew Petter
Minister

Province of British Columbia
OFFICE OF THE MINISTER

Ministry of Forests

MEMORANDUM

File: 16290-01

February 26, 1996

To: Larry Pedersen
Chief Forester

From: The Honourable Andrew Petter
Minister of Forests

Re: The Crown's Economic And Social Objectives Regarding Visual Resources

Further to my letter of July 29, 1994, to your predecessor, wherein I expressed the economic and social objectives of the Crown in accordance with Section 7 of the *Forest Act*, I would like to elaborate upon these objectives as they relate to visual resources.

British Columbia's scenic landscapes are a part of its heritage and a resource base underlying much of its tourism industry. They also provide timber supplies that are of significant economic and social importance to forest industry dependent communities.

Accordingly, one of the Crown's objectives is to ensure an appropriate balance within timber supply areas and tree farm licence areas between protecting visual resources and minimizing the impact of such protection measures on timber supplies.

As you know, I have directed that the policy on management of scenic landscapes should be modified in light of the beneficial effects of the Forest Practices Code. In general, the new policy should ensure that establishment and administration of visual quality objectives is less restrictive on timber harvesting. This change is possible because alternative harvesting approaches as well as overall improvement in forest practices will result in reduced detrimental impacts on visually sensitive areas. Also, I anticipate that the Forest Practices Code will lead to a greater public awareness that forest harvesting is being conducted in a responsible, environmentally sound manner, and therefore to a decreased public reaction to its visible effects on the landscape. In relation to the Allowable Annual Cuts determinations that you make, please consider the effects that the new policy will have in each Timber Supply Area and Tree Farm Licence.

.../2

In keeping with my earlier letter, I would re-emphasize the Crown's objectives to ensure community stability and minimize adjustment costs as the forest sector moves to more value-based management. I believe that the appropriate balance between timber and visual resources will be achieved if decisions are made consistent with the ministry's February 1996 report *The Forest Practices Code: Timber Supply Analysis*.

Finally, in my previous letter I had asked that local economic and social objectives be considered. Please ensure that local views on the balance between timber and visual resources are taken into account within the context of government's broader objectives.

Andrew Petter
Minister of Forests

Okanagan Timber Supply Area
Timber Supply Review

Summary of Public Input

British Columbia Ministry of Forests
Vernon Forest District
2501 14th Ave.
Vernon, BC V1T 8Z1

British Columbia Ministry of Forests
Penticton Forest District
102 Industrial Place
Penticton, BC V2A 7C8

British Columbia Ministry of Forests
Salmon Arm Forest District
850 16th St. NE
100 Station Main
Salmon Arm, BC V1E 4S4

July, 2001

This is a summary of the public input received on the Timber Supply Review in the Okanagan Timber Supply Area. This summary does not assess the feasibility or validity of the input or whether it relates to the clearly defined mandate of the chief forester in the allowable annual cut determination.

Background

As part of the review of timber supply in the Okanagan Timber Supply Area (TSA), two opportunities were provided for public input. The first followed release of the Okanagan Timber Supply Area *Data Package* and *Information Report* in June 1999. The *Information Report* was a non-technical summary of the draft data and management assumptions that were to be applied in reviewing the timber supply for the Okanagan TSA. A 30-day review period, ending July 5, 1999, was provided for the public to comment on these documents.

On July 13, 2000, the British Columbia Forest Service released the *2000 Okanagan Timber Supply Area Analysis Report* and *Public Discussion Paper*. The public was encouraged to review and comment on the accuracy of the information in these documents and to provide additional information during the 60-day review period that ended September 11, 2000.

This report summarizes the input received during both public review periods. This information was provided to the chief forester for his consideration when he reviewed the allowable annual cut (AAC) for the Okanagan TSA. The first section of this summary outlines the public review process implemented by the Forest Service, and describes the types of public input received. The second section summarizes the public input in sufficient detail to indicate the range of input received. The original submissions (with personal identifiers removed in accordance with the *Freedom of Information and Protection of Privacy Act*) can be reviewed at the Vernon Forest District office.

Public Review Process and Response

Salmon Arm, Vernon and Penticton district staff actively solicited public input on the Timber Supply Review in the Okanagan TSA through the following actions:

- direct mail-out of 80 copies of the *Information Report*, *Data Package* and *Public Discussion Paper* to key organizations in the Okanagan TSA or adjacent TSAs.
- the *Data Package* and the *Okanagan Timber Supply Area Analysis Report* were available at all three district offices and at the Kamloops Regional Office.
- members of the Okanagan-Shuswap Land and Resource Management Planning team were kept informed of the process of the Timber Supply Review.
- local media were informed of the release of the Timber Supply Review documents.

The three forest district offices received five written submissions on the *Data Package* and 11 submissions on the *Analysis Report* (see Appendix 1).

Public Input

In this section, public input on the information presented in the Timber Supply Review documents for the Okanagan TSA is summarized under the following headings:

- Data Package (and Information Report)
- Timber Supply Area Analysis Report (and Public Discussion Paper)
- Other comments

Data Package

Land Base Factors
Several submissions comment on factors that affect the size of the land base available for timber harvesting.

The Shuswap Okanagan Forest Association (SOFA) questions the exclusion of lands with certain ownership codes, noting these areas can contribute to timber supply unless the specific lease prohibits timber harvesting. The Interior Lumber Manufacturers' Association (ILMA) says many non-timber values must take into account the land base and forest structure both within the timber harvesting land base (THLB) and outside it. The association says it's unclear how these values will be modelled and questions if there's an intent to define a harvesting land base as well as a land base for non-timber values.

Riverside Forest Products states its agreement with the commitment to monitor Environmentally Sensitive Areas (ESAs) to see if harvesting is occurring in these types, while the ILMA questions this monitoring and asks if licensees were involved in the classification of ESAs.

With regard to sites with low timber growing potential, SOFA says these should be limited to lodgepole pine stands younger than 80 years and other species younger than 100 that have not reached the defined height. SOFA says older stands would be covered under problem forest types. Riverside says they are harvesting sites that will be excluded from the analysis and says this issue should be monitored.

With regard to problem forest types, SOFA says it should be made clear that the change from 60% hemlock to 70% hemlock to define hemlock-leading stands is not the result of a change in merchantability but reflects audit results that identified the misclassification of many stands. The ILMA questions if any monitoring is occurring to determine if these problem forest types are currently being harvested and asks whether, if a certain type is large enough, the timber supply analysis could include a sensitivity to examine the potential for a partitioned cut.

SOFA expresses the opinion that, although the chief forester decided to include decadent hemlock (age class 8 and 9) in the last determination, this volume should be excluded from the base case. The association says adding this decadent wood, which is only suitable for pulp, to the AAC reduces overall wood supply and impacts mill viability.

SOFA notes that wildlife tree patches cannot be harvested and must be removed from the THLB. The association suggests a 3% area reduction.

With regard to land base withdrawals due to roads, trails and landings, the ILMA says the issue is growing space, not necessarily the surficial area occupied by these structures. The association requests further explanation of assumptions. Riverside Forest Products says the estimates for existing roads and landings appear reasonable, and the netdown for trails should be minimal given the increasing requirements for rehabilitation of trails. The company says the 1.7% netdown for future trails is too high.

Expected Rate of Growth and Productivity
Two forest industry submissions express the opinion that managed stand yield curves should be applied to all planted stands, not just those less than 21 years of age. The ILMA states its assumption that these curves will be applied to stands less than 21 years of age.

Three forest industry submissions question the Operational Adjustment Factors (OAFs) used in the analysis. The submissions identify several particular instances in which they believe the OAFs are too high.

The ILMA asks for an opportunity to discuss concerns about the lack of differentiation in minimum harvestable age between existing and regenerated stands.

Regeneration Delay
Three forest industry submissions question the four-year regeneration delay. They point out that in other TSAs the delay has been reduced to an average of two years or less. SOFA says prompt planting is now the norm and a two-year regeneration delay would be appropriate.

Forest Cover Requirements
Riverside says all forests should contribute to the forest cover requirements used to achieve various management objectives, not just forests in the THLB.

Two forest industry submissions say the cover requirements for visual quality should apply only to known scenic areas, as designated under the Okanagan Timber Harvesting Guidelines. They say this accurately reflects current management. The ILMA says the impact of these very restrictive assumptions cannot be known without further information and requests to know how the visual quality values were developed and justified.

With regard to ungulate winter range, the ILMA says only those areas legally identified under the Operational Planning Regulation should be modelled.

Riparian Areas and Watersheds
Three forest industry submissions raise several concerns with regard to riparian management areas. Their comments include:

- the overall riparian reserve of 12.4 metres is excessive and does not represent current management.
- the estimated 4,000 km of S1 (over 20 metre-wide) streams is questionable. Most land adjacent to these streams is privately owned and therefore already withdrawn from the THLB.
- the retention values for the smallest streams are larger than those currently being used, due to windthrow risk. Riverside recommends reducing these values by one-half.
- SOFA says the distribution of fish-bearing streams should be based on the Wildstone Report, rather than assuming all streams have fish. The ILMA notes a lack of substantiation of the assumptions used by Wildstone.
- while the Riparian Retention Zone can be used to meet seral stage objectives, the retention portion of the Riparian Management Zone should not be used.
- the percentage retention for the Riparian Management Zone is the maximum and should not be interpreted as being the required or target level. More appropriate retention numbers are 25% for S1-S3, 13% for S4 and S5, and 3% for S6.

With regard to watershed areas, SOFA notes that the assumption that an eight-metre green-up height is needed for hydrologic recovery does not consider the partial recovery provided by shorter stands, and recommends using a six-metre height. Riverside questions if watershed areas have been correctly mapped and whether the maximum disturbance process is consistent with current approaches.

Non-Recoverable Losses
The ILMA states its assumption that values for unsalvaged losses were created using the process developed in Revelstoke.

Okanagan-Shuswap Land and Resource Management Plan (LRMP)
MLA Rick Thorpe asks what the impacts of the LRMP process will be. Riverside says the Introduction to the *Data Package* makes it sound as if the LRMP is current management and says it should only be considered in a

sensitivity analysis.

Socio-Economic Factors
Riverside notes its surprise that forestry, mining and agriculture no longer provide the majority of employment in the Okanagan TSA.

The regional district director for the Lower Similkameen says the Timber Supply Review does not meet the social, economic and environmental needs of the residents of that area. He says the past and present allocation of the AAC has left little opportunity for First Nations and other community members, and attempts to acquire a community forest licence have been unsuccessful. Frustration has lead to First Nation blockades of harvesting areas, the director says, and the province must address these issues or remove this area from the AAC.

Timber Supply Area Analysis Report

Land Base Factors
The Little Shuswap Indian Band says the removal of areas from the THLB gives the impression of a higher productive capacity than may actually be present. The Band also says it can be argued that wildlife tree patches will eventually be harvested and are not permanently defined forest sites.

The BC Environment submission says it was their understanding the reduction for areas with regeneration problems was to be 100% not 90% as indicated in Table A-5.

Two submissions say the increase in land base due to the inclusion of problem forest types is questionable, since these types are often less likely to be logged. The Little Shuswap Band says more detail is needed on the new criteria used to define problem forest types and low productivity sites.

Forest Inventory Factors
Five submissions raise concerns regarding the forest inventory in this TSA. The concerns include:

- the age of the inventory information and the need to update it.
- the need for an inventory audit, particularly in the northern part of the TSA.
- the need for inventory work to address concerns about the impact of high-grading on remaining stand volumes, and to reflect the lack of full-profile logging over the last five years, particularly in the Interior Douglas-fir selection zone.
- because the remaining forests are on steep ground or in other sensitive areas, it's an illusion there's plenty of timber left. Companies have difficulty finding enough cutblocks.

Volume Estimates and Expected Rate of Growth
Two submissions say that 40 years of high-grading the best quality, highest volume and easiest to access timber has resulted in lower volumes in residual stands than indicated by the inventory. The remaining stands are located on steeper slopes, in higher elevations or on poor growing sites, which means they are more likely to contain lower value stands, according to these submissions.

The Little Shuswap Indian Band says it seems apparent a large information gap exists around the actual productivity of old-growth forests, and this gap renders the base case substantially inaccurate. The Band says a greater provincial effort is needed to improve incremental silviculture to achieve the projected increased yield from managed stands.

A submission from eight Registered Professional Foresters working in the Okanagan TSA says the analysis is very conservative regarding future stand productivity. The submission notes that adjustments based on Old

Growth Site Index studies were not considered despite significant gains in productivity that result from their application in other parts of the province. Three other submissions comment on uncertainties regarding these studies and the importance of calibrating their results for the Okanagan TSA. Two environmental groups say that as the studies only measured potential growth, management factors are likely to negate any possible gains that could be anticipated.

With regard to minimum harvestable ages, the Little Shuswap Indian Band says First Nations were not consulting in establishing these ages and it appears no consideration was given to the appropriate age for non-timber values, only for timber.

Regeneration Delay
Two environmental groups say steep hillsides and higher elevation areas hold many of the remaining forests in this TSA, and express concern that these sites are more difficult to regenerate, resulting in long-term disturbances.

Forest Cover and Green-up Requirements
Two environmental groups note that cutblock adjacency has been seriously limiting licensees and has also resulted in severe fragmentation of the landscape. They note the LRMP planning table agreed to lower green-up height to two metres, except in watersheds and viewsheds.

BC Environment (BCE) questions whether large lakes have been accounted for with appropriate riparian reserves.

BCE says Ungulate Winter Range has not been modelled accurately and three key assumptions do not reflect current management:

- the minimum height requirement should be 25 metres;
- it's unlikely that minimum height can be reached within 75 years in all forest types; and
- selection criteria should be used in the significant areas of overlap between the selection zone and ungulate winter range.

Biodiversity and Old Growth
An individual submission expresses concern at the loss of old and mid-aged trees on the THLB, saying this represents a loss of biodiversity across the landscape.

Three submissions express disagreement with the assumption that forests outside the THLB will continuously age and provide old growth representation. They say disturbances occur in these forests, such as fires which have proven extremely difficult to suppress. BCE says a correction factor is required because one can only assume that a fraction of non-THLB forests would meet the old seral definition over time.

Two submissions note that while the analysis indicates a preponderance of old growth, the landscape unit planning analysis shows very little old growth in many biogeoclimatic variants.

Okanagan-Shuswap LRMP
Six submissions say the recently ratified LRMP should be incorporated into the analysis, or the process delayed to allow for this. Two submissions note that the timber supply analysis done for the LRMP shows the new parks and improved management of non-timber values will not impact timber supply.

Non-Recoverable Losses
Three submissions question the significant reduction in non-recoverable losses despite the increase in fires and beetle attacks in this TSA. The Salvage Loggers Association says that with increased recovery, through a salvage partition, this lost volume could be significantly reduced.

Socio-Economic Impacts
The submission from the Salvage Loggers Association says that although forestry only accounts for 7.5% of employment in the TSA as a whole, that figure is much higher in the Lumby-Cherryville area. The association provides information on the economic impact of salvage logging, based on a one-year study, and describes increased opportunities that could be created for salvage work.

The regional district director for the Lumby rural area says over the past two years employment and the tax base have been severely reduced by the closure of the Weyerhaeuser mill and the announced closure of Riverside's stud mill. Unemployment is in the 25% range, the director says, and social problems have significantly increased. The regional district has supported a community forest proposal as a way to diversify the economy, according to the director.

Four submissions question whether the socio-economic analysis accounted for the fact that 40% of the wood supply comes from non-TSA land. For example, the submissions question the statements in Section 7.3.1 regarding impacts from a decreased AAC based on the current quantity of wood billed (which includes non-TSA wood).

Three submissions make the following comments about socio-economic impacts:

- the economic role of forestry is decreasing but the analysis does not look at how other economic sectors benefit from non-timber forest values. U.S. studies have shown that local economies benefit more from forest protection than forest liquidation.
- it appears both employment and income levels are not directly tied to AAC levels as the analysis suggests. For example, the closure of two Lumby mills despite a constant AAC.
- the long-term economic and social impacts of the current policy of liquidation of nearly all primary forests in the THLB have not been adequately addressed.

Environmental Objectives
Four submissions express the opinion that the analysis does not adequately account for non-timber, environmental values or accurately assess the environmental implications of the base case or alternative rates of logging.

Other Comments

Many submissions commented on factors or issues other than those specifically covered by Timber Supply Review documents. These comments are summarized in this section.

Timber Supply Review Process
Six submissions comment in some detail about the process and/or methodology of the Timber Supply Review. These comments include:

- the review process appears to be sound and comprehensive.
- the lack of detailed analysis implies the expedient delivery of inaccurate information is more important than determining a truly sustainable harvest level.
- the *Data Package* does not provide sufficient specific data to permit a fair evaluation or understand impacts.
- to reflect current management, the base case should only include legal requirements. Others, such as landscape units or protected areas, should only be examined in a sensitivity analysis.
- the process does not adequately account for non-timber values or the fact that much of the remaining harvestable timber is on environmentally sensitive and higher elevation sites.
- a spatial analysis should be done to test the predictions of the analysis.
- predicting the future is fraught with

problems, from climate change to the impact of forest certification on markets.

In addition, four submissions suggest the need to consider dividing the TSA into two areas (the Shuswap and the Okanagan).

Harvest Levels and Partitions

Ten submissions comment on the harvest level to be determined by the chief forester.

Six submissions express opposition to any increase in harvest levels, because of the unreliability of forest inventories and because of the need to first resolve outstanding issues (e.g., designation of Old Growth Management Areas, increased riparian retention, etc.) through the LRMP process. Three of these submissions say that when the LRMP is completed and new operating areas are defined, if licensees continue to have trouble locating timber, the AAC should be reduced.

Three submissions express support for an increased AAC, for the following reasons:

- to allow for a community forest licence in the Lumby area, thereby creating diversification, business opportunities and stability.
- the age of the stands in the THLB means increased harvesting should occur or the volumes will be lost to disease, insects, etc.
- the anticipated increase in future productivity, based on results of the Old Growth Site Index studies.

The United Salvage Loggers Association requests a partition of the new AAC to be allocated to the salvage program. The association says expanding the program back to traditional levels will help offset economic hardships from mill closures, create local socio-economic benefits, and provide wood for value-added plants as well as major licensees.

First Nations

The Little Shuswap Indian Band says the timber supply analysis fails to consider the impacts of treaty negotiations and recent Court rulings confirming aboriginal rights and title to lands and resources. As well, the Band says the analysis does not consider netdowns for areas of high cultural sensitivity, contemporary traditional uses, First Nation access to resources through inherent rights, integration of traditional ecological knowledge into planning, or the myriad of other pressing First Nations concerns regarding the forest resource and associated economic benefits.

The Westbank First Nation demands an immediate end to the Timber Supply Review, and instead calls for resolution of First Nation issues. This submission notes that all land and resources within the Okanagan TSA have encumbered title, and any infringement on or alteration of land and resources is detrimental to the successful conclusion of land claim negotiations. The Westbank First Nation says no meaningful First Nation participation in the Timber Supply Review has occurred, and notes the need for resources if sound decisions are to be made when referrals such as this occur. According to their submission, the Westbank First Nation are proceeding toward implementation of the 1997 Delgamuukw decision, which includes tests of aboriginal rights and title, as well as planning for a Westbank community forest.

Appendix 1

Submissions received by the Salmon Arm, Vernon and Penticton Forest Districts

Submissions received on the Data Package

Government
Rick Thorpe, MLA, Okanagan-Penticton
Roger Mayer, Director Area G, Regional District of Okanagan Similkameen

Forest Industry
Shuswap Okanagan Forest Association
Interior Lumber Manufacturers' Association, Kelowna
Riverside Forest Products Ltd., Lumby

Submissions received on the Timber Supply Analysis Report

Government Agencies
BC Environment, Southern Interior Region

Local Government
L.T. Deuling, Director Area D, Regional District of North Okanagan

First Nations
Little Shuswap Indian Band, Chase
Westbank First Nation, Kelowna

Interest Groups
Canadian EarthCare Society, Kelowna
Turtle Island Earth Stewards, Salmon Arm
Shuswap Environmental Action Society, Chase
Community Forest Committee, Lumby

Forest Industry
Registered Professional Foresters (8), working in Okanagan TSA
United Salvage Loggers Assoc. of B.C.

General Public
One individual submission